



Marijuana Legalization in the Midwest: The Potential Impact

March 2019

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Table of Contents

Introduction	5
The Midwest HIDTA Region	5
Purpose.....	5
Background.....	6
Executive Summary	7
Chapter 1: Diversion, Crime, and Traffic Fatalities	12
Chapter Summary	12
Overproduction.....	13
Inadequate Regulation	13
Diversion and Trafficking.....	14
Parcel.....	14
Crime	17
Traffic Fatalities and Impaired Driving	22
Chapter 2: Accessibility and Use.....	25
Chapter Summary	25
State Estimates of Youth Marijuana Use.....	25
State Estimates of Adult Marijuana Use	28
The Alaskan Example.....	29
Chapter 3: Impacts on Health	31
Chapter Summary	31
Emergency Room Visits, Hospitalizations, and Poison Center Data	31
THC Extraction Labs	34
Pesticide Use	35
Contents of Marijuana Smoke	36
Chapter 4: Potency	37
Chapter Summary	37
Modern Marijuana	37
Edible Marijuana	39
Chapter 5: Marijuana as an Opioid Alternative.....	41
Chapter Summary	41
Research.....	41

Chapter 6: The Inadequacies of Marijuana Reporting Systems	44
Chapter Summary	44
Midwestern Requirements	44
Seed-to-sale	45
RFID	46
Cloning	46
Theft	47
Self-reporting Data Quality	47
Chapter 7: Marijuana Revenue.....	48
Chapter Summary	48
Estimated Revenue for Midwest.....	48
Costs and Benefits of Marijuana in Colorado	49
Additional Costs.....	50
Falling Marijuana Prices.....	51
Chapter 8: Regulatory Overview.....	53
Chapter Summary	53
Dosing Concerns and Physician Guidelines	53
Purchase and Possession Limitations.....	54
Packaging, Labeling, and Marketing.....	55
Chapter 9: Terminology	57
Chapter Summary	57
“Recreational” Marijuana	57
“Medical” Marijuana	58
“Medical” Cannabidiol.....	59
Cannabis: A “Rebranding” of Marijuana	59
Conclusion.....	61
Appendices:.....	63
Iowa Code Chapter 124E.....	63
Missouri Amendment 2	65
North Dakota Measure 5.....	67
References.....	69

Introduction

The Midwest HIDTA Region

The Midwest HIDTA's seven-state area consists of Iowa, Kansas, Missouri, Nebraska, North Dakota, South Dakota, and Rock Island County, Illinois. The region spans over 428,000 square miles, encompasses 72 HIDTA-designated counties, and is considered the largest of the Office of National Drug Control Policy's 28 HIDTA regions. It is as varied as it is vast, and incorporates major urban cities, separated by suburban sprawl and rural bucolic settings. Within the Midwest HIDTA are more than 4,300 miles of interstate highways and an international border stretching over 300 miles. Its central location and intertwining roadways make the region ideal for drug trafficking organizations and criminal entrepreneurs intent on transporting drugs into or through to other destinations.

Purpose

The purpose of this report is to examine the effects of marijuana legalization in other states in order to provide drug policy experts and law enforcement leaders with potential impacts and consequences for Midwestern states that are contemplating the legalization of "medical" and/or "recreational" marijuana. This report will utilize data and trends from other states with legalized marijuana access in order to develop accurate and relevant predictions. California, Colorado, Oregon, and Washington will frequently be cited and used for comparison as their marijuana programs have existed long enough for an adequate amount of data to be collected. This data includes, but is not limited to:

- Marijuana-related crime and violence
- Marijuana diversion
- Drugged driving and traffic fatalities
- Adult and youth marijuana use
- Health-related impacts
- The social costs of legalization
- Marijuana-related revenue

Background

As of March 2019, two Midwest HIDTA states have legalized “medical” marijuana and one has legalized “medical” cannabidiol (mCBD). Both Missouri and North Dakota have authorized the cultivation, distribution, and consumption of marijuana for “medical” purposes. Missouri passed Amendment 2 in November 2018, branding Missouri as the thirty-second state to legalize “medical” marijuana. The program is currently inoperable, but the Missouri Department of Health and Senior Services (DHSS) will begin accepting applications for manufacturing, cultivation, and dispensing facilities in August 2019. North Dakota Measure 5 passed in 2016, allowing marijuana to be used for “medical” purposes. North Dakota’s marijuana program is not yet operational, but state dispensaries are scheduled to open in 2019. In 2017, Iowa passed a legislative initiative allowing the medical use of cannabidiol (CBD) for individuals with one of nine qualifying medical conditions. The program is administered by the Iowa Department of Public Health (IDPH) and became operational in 2018. The program authorized mCBD products containing no more than three percent delta-9-tetrahydrocannabinol (THC) for non-smoking use.

Kansas, Nebraska, and South Dakota have yet to pass legislation authorizing the use of “medical” or “recreational” marijuana, although bills have been introduced. Legislative Bill 110, also known as the “Medical Cannabis Act”, was introduced in the Nebraska State Legislature in January 2019. If passed, the bill would change provisions relating to controlled substances and taxation, and create a framework for “medical” marijuana. House Bill 2163, also known as the “Veterans First Medical Cannabis Act”, was introduced in the Kansas State Legislature in February 2019. If passed, the bill would authorize the use of marijuana in Kansas for health reasons. The “South Dakota Marijuana Legalization Initiative” may appear on South Dakota’s November 2020 ballot. If passed, the measure would allow anyone over age 21 to possess, grow, distribute, and sell marijuana and marijuana paraphernalia.

Executive Summary

Marijuana is the most widely available and commonly abused illicit drug in the United States. The legalization of marijuana invokes consequences that are both extensive and underreported, and its impacts on public health, safety, and the economy are observable in many states with legalized access. The Midwest is not immune to the adverse effects of marijuana legalization. This report will examine those and other potential effects in the following sections.

Chapter 1: Diversion, Crime, and Traffic Fatalities

- In 2018, more than 53,350 pounds of marijuana were removed from illicit markets in the Midwest HIDTA.
 - Marijuana represented 90 percent of the total drug weight confiscated by Midwest HIDTA initiatives in 2018.
- Ninety-two percent of the 1,491.8 pounds of marijuana and marijuana products mailed to Iowa, Missouri, and North Dakota in 2018 originated from California, Colorado, Oregon, and Washington.
- Colorado, Oregon, and Washington all experienced increases in violent crime and property crime in the years following legalization.¹
- The number of fatalities involving a driver testing positive for marijuana in California increased by 34 percent between 2005 (n=273) and 2015 (n=366).¹
- After “recreational” marijuana was legalized in Colorado, marijuana-related traffic deaths increased 151 percent while overall Colorado traffic deaths increased by 35 percent.²
- The total number of Drug Recognition Expert investigations between 2014 and 2016 that resulted in a marijuana-impaired driving outcome increased by 66 percent in Oregon.³
- Fifty-one percent of drug-related fatal crashes in Iowa involved marijuana in 2016, compared to 41 percent nationwide.⁴

¹ All NIBRS data for California is unavailable during this time period.

Chapter 2: Accessibility and Use

- As California, Colorado, Oregon, and Washington saw a proliferation of “medical” marijuana dispensaries, they also saw a corresponding increase in marijuana use among all ages, as well as a decrease in the perception of risk, in the years following legalization.^{5 6}
- In 2017, past month marijuana use among youth aged 12-17 was:
 - Seven percent higher in California than the U.S. average;⁷
 - Forty percent higher in Colorado than the U.S. average;⁸
 - Sixty percent higher in Oregon than the U.S. average;⁹
 - Thirty-nine percent higher in Washington than the U.S. average.¹⁰
- In 2017, past year marijuana use among youth aged 12-17 was:
 - Nine percent higher in California than the national average;¹¹
 - Thirty-nine percent higher in Colorado than the national average;¹²
 - Forty percent higher in Oregon than the national average;¹³
 - Twenty-three percent higher in Washington than the national average.¹⁴
- An Emory University study observed increases in current marijuana use, frequency of marijuana use, and marijuana dependence among those aged 21 or older after the implementation of “medical” marijuana laws across seven states.¹⁵
- Alaska’s experiment with legalized marijuana in the 1970s demonstrated that an increase in access led to an increase in use. During the 15 year experiment, marijuana use among Alaskan adolescents was double (51.6 percent) the national average (23.7 percent) for the same age group.¹⁶

Chapter 3: Impact to Health

- California, Colorado, and Oregon all experienced increases in marijuana-related emergency department visits after the commercialization and/or legalization of marijuana.
- THC extraction labs present their own risks to public health. The process, which carries a significant risk of explosion, yields highly potent marijuana concentrates. In 2016, 79 percent of nationally reported clandestine THC extraction labs occurred in California.¹⁷

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- There is limited information available from state agencies regarding pesticide testing. This is worrisome in regards to health risks to consumers, as it makes it difficult to calculate rates of marijuana contamination.

Chapter 4: Potency

- According to the University of Mississippi's Potency Monitoring Program, the average percentage of THC found in samples of marijuana seized by the DEA increased 199 percent between 1995 and 2014.¹⁸ THC levels were measured at approximately 3.96 percent in 1995 and increased to approximately 11.84 percent in 2014.¹⁹
- During that same period, the average percentage of CBD decreased 48 percent.
- Beginning in 2001, the average level of CBD steadily declines while the average level of THC steadily increases.
- The levels of THC within edibles can vary across a single product or across entire batches. This makes it difficult for users to estimate how much THC they consume, increasing the risk of overdose and adverse reactions.²⁰

Chapter 5: Marijuana as an Opioid Alternative

- Unlike drugs approved by the FDA, "medical" marijuana has no standard in quality control or production measures, nor are there high-quality studies of its effectiveness or long-term safety.
- Both the CDC and FDA state that there is not enough evidence that supports marijuana as an opioid alternative at this time.
- Every state with an operational "medical" marijuana program in 2015 that reported overdose death data to the Centers for Disease Control and Prevention (CDC) also experienced an increase in drug overdose deaths involving synthetic opioids between 2015 and 2017.²¹
- Studies that demonstrate a cannabinoid's beneficial effect on an illness are for that specific cannabinoid and not the entire marijuana plant.

Chapter 6: The Inadequacies of Marijuana Reporting Systems

- Iowa's, Missouri's, and North Dakota's marijuana programs require the implementation of either a seed-to-sale or barcode tracking system.
- Self-reporting systems have proven to be ineffective in preventing diversion as there are no ways to ensure that dispensaries publish accurate or truthful data.²²
- The potential for diversion exists within every state of marijuana cultivation, regardless of the technologies used in the process.

Chapter 7: Marijuana Revenue

- The total expected revenue for Iowa's mCBD program is not known at this time. All patient, primary caregiver, dispensary, and manufacturer licensing and registration fees are collected by the IDPH.²³ Manufacturers must reimburse the Iowa Department of Public Safety for the full cost of the background investigations required for licensing.²⁴
- Missouri's "medical" marijuana program is expected to bring an unsubstantiated \$24 million in taxes and fees to state and local governments.
- North Dakota's "medical" marijuana program does not levy an excise tax on marijuana sales. As a result, marijuana sales will be subject only to state and local sales taxes.
- For every dollar Colorado gained in tax revenue from marijuana sales, Coloradans spent over \$4.50 to mitigate the social costs of legalization.²⁵
- The long term environmental, economical, mental and physical health, and societal impacts of marijuana cultivation and consumption are not fully understood. Legalized marijuana is likely to have consequences that scientists may not discover for decades.

Chapter 8: Regulatory Overview

- Iowa's, Missouri's, and North Dakota's marijuana measures all fail to establish safe and effective dosage guidelines for physicians, while simultaneously promoting marijuana's purported effectiveness in treating illness without offering substantial evidence.

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- Iowa's mCBD program limits a patient to a 90-day supply of authorized CBD containing no more than three percent THC.
 - If limitations are enacted by the Missouri DHSS, "medical" marijuana patients may possess no less than four ounces and cultivate up to six flowering plants.
 - The North Dakota Department of Health has limited dispensaries from supplying more than three ounces of marijuana to a patient every 14 days. Patients residing more than 40 miles from a dispensary may cultivate up to eight plants.

Chapter 9: Terminology

- There are significant differences between the "medical" and "recreational" marijuana movements and their respective products. There are also significant differences between mCBD and CBD.
- Extensive scientific research has only been performed on two of the more than 480 chemical components in marijuana, which is why it has yet to receive approval from the Food and Drug Administration (FDA).
- The marijuana industry increasingly uses the term "cannabis" in an effort to rebrand marijuana and distance itself from the stigmatization and negative connotations associated with the term over the past century.

Chapter 1: Diversion, Crime, and Traffic Fatalities

Chapter Summary

This chapter will examine the correlation between marijuana legalization, traffic fatalities, crime rates, and diversion to illicit markets. The following information was collected from state marijuana authorities, as well as federal, state, and local law enforcement agencies:

- In 2018, more than 53,350 pounds of marijuana were removed from illicit markets in the Midwest HIDTA.
 - Marijuana represented 90 percent of the total drug weight confiscated by Midwest HIDTA initiatives in 2018.
- Ninety-two percent (1372.5 pounds) of the seized marijuana and marijuana products mailed to Iowa, Missouri, and North Dakota originated from California, Colorado, Oregon, and Washington in the third and fourth quarters of 2018.
- Colorado, Oregon, and Washington all experienced increases in violent crime and property crime in the years following legalization.^{II}
- The number of drivers involved in traffic fatalities that tested positive for marijuana have significantly increased over the past decade in both California and Colorado.
- The total number of Drug Recognition Expert investigations between 2014 and 2016 that resulted in a marijuana-impaired driving outcome increased by 66 percent in Oregon.²⁶
- Fifty-one percent of drug-related fatal crashes in Iowa involved marijuana in 2016, compared to 41 percent nationwide.²⁷

^{II} All NIBRS data for California was unavailable during this time period.

Overproduction

Marijuana diversion represents a major challenge to both law enforcement and public health agencies. Marijuana products are frequently produced in “legal” states, trafficked across state lines, and distributed via black markets. States with legalized marijuana are major suppliers to the rest of the United States.^{III} The overproduction of marijuana occurs when the supply exceeds the demand and the resulting stockpile drives down prices in the legal retail market. The only legal option for growers or dispensaries with a surplus of marijuana is to auction it at a heavily discounted price or suffer total loss. Overproduction leads some businesses or individuals to sell marijuana on the black market, often untaxed and at high prices, where it is ultimately trafficked out of state.

Many states struggle with overproduction. Estimates predict Oregon marijuana users consume approximately 185,188 to 372,581 pounds annually.²⁸ As of 2018, only 31 percent of the state’s recreational marijuana inventory had been distributed, leaving 69 percent unconsumed. Between July 2014 and June 2015, 32 percent of the marijuana produced in Washington remained unsold, according to data from the state Liquor and Cannabis Board. The Director of the California Growers Association stated in July 2017 that the state produced eight times the amount of marijuana that is consumed.^{29 30}

Inadequate Regulation

A January 2019 report issued by Oregon Secretary of State Dennis Richardson asserts that Oregon’s marijuana program has failed to meet mandatory state inspections. Gaps in the state marijuana program’s regulatory framework have contributed to the diversion of marijuana to black markets.³¹ The Oregon Liquor Control Commission, which is responsible for the regulation of the marijuana industry, has not been able to properly enforce facility inspections and reporting because no cap was placed on the number of cultivation licenses. Only three percent of retailers and 32 percent of growers have had a compliance inspection.³² Due to the lack of regulation in Oregon’s marijuana industry, approximately 14,550 pounds of marijuana have been seized en route to 37 states between July 2015 and January 2018.³³

^{III} This statement is supported by data collected from the MW HIDTA DHE program, the Rocky Mountain HIDTA, Oregon-Idaho HIDTA, national seizure reporting systems, postal seizures, and other law enforcement resources.

Of the 33 states with some form of legalized marijuana, only one needs to have faulty regulation to be capable of exporting tens of thousands of pounds throughout the country.

Diversion and Trafficking

Midwest HIDTA initiatives confiscated more than 53,350 pounds of marijuana in 2018. Marijuana represented 90 percent of the total drug weight seized by Midwest HIDTA enforcement initiatives in this time period. The most popular methods used to divert “medical” and “recreational” marijuana are through the use of privately owned vehicles and postal services. Marijuana is routinely seized during traffic stops, at bus and train terminals, and in mail centers within the Midwest HIDTA. Seizures involving hydroponic, “medical”, and other high-grade marijuana transported from California, Colorado, Oregon, Washington and other states have become commonplace.

The Midwest HIDTA Domestic Highway Enforcement (DHE) program seized 26,267 pounds of marijuana and marijuana products that were destined to or transiting through the Midwest HIDTA in 2018. Of the 1497 DHE events involving marijuana, 74 percent (n=741) originated from states with “recreational” marijuana programs and 75 percent (n=789) originated from states with either a “medical” marijuana or “recreational” marijuana program.

With functioning medical marijuana programs, it is possible that Missouri and North Dakota will become source states for marijuana exports. This will directly impact the Midwest as higher quality marijuana becomes available in closer proximity, reducing the distance diverted marijuana must travel to its market.

Parcel

The accompanying maps display packages containing marijuana (or marijuana products) destined for Iowa, Missouri, and North Dakota. The data only includes packages that were intercepted in the third and fourth quarters of 2018. Figures 1-3 illustrate packages identified as containing marijuana or marijuana products destined for Iowa, Missouri, and North Dakota, respectively. Using cluster analysis, Figure 4 shows that the bulk of Iowa, Missouri, and North Dakota-bound marijuana originated from California, Colorado, Oregon, and Washington. These four states, each with a “medical” and “recreational” marijuana program, represented 92 percent of the 1,491.8 pounds of marijuana and marijuana products destined for Iowa, Missouri, and North Dakota.

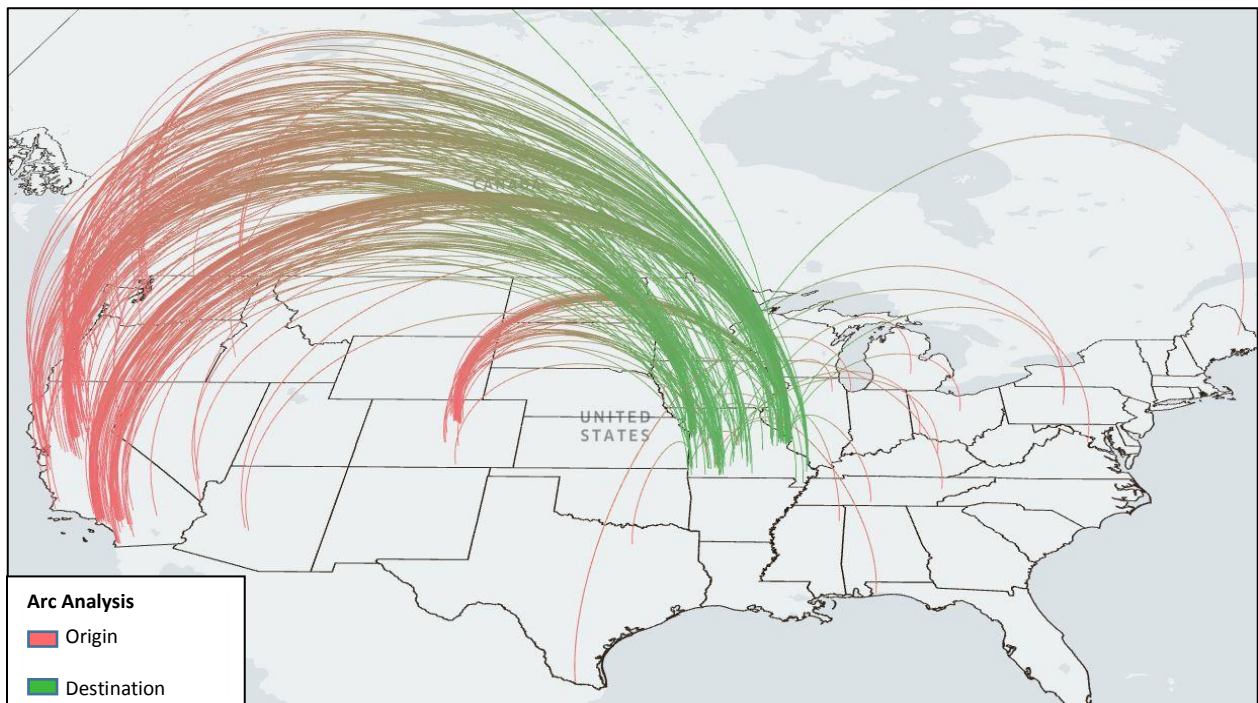
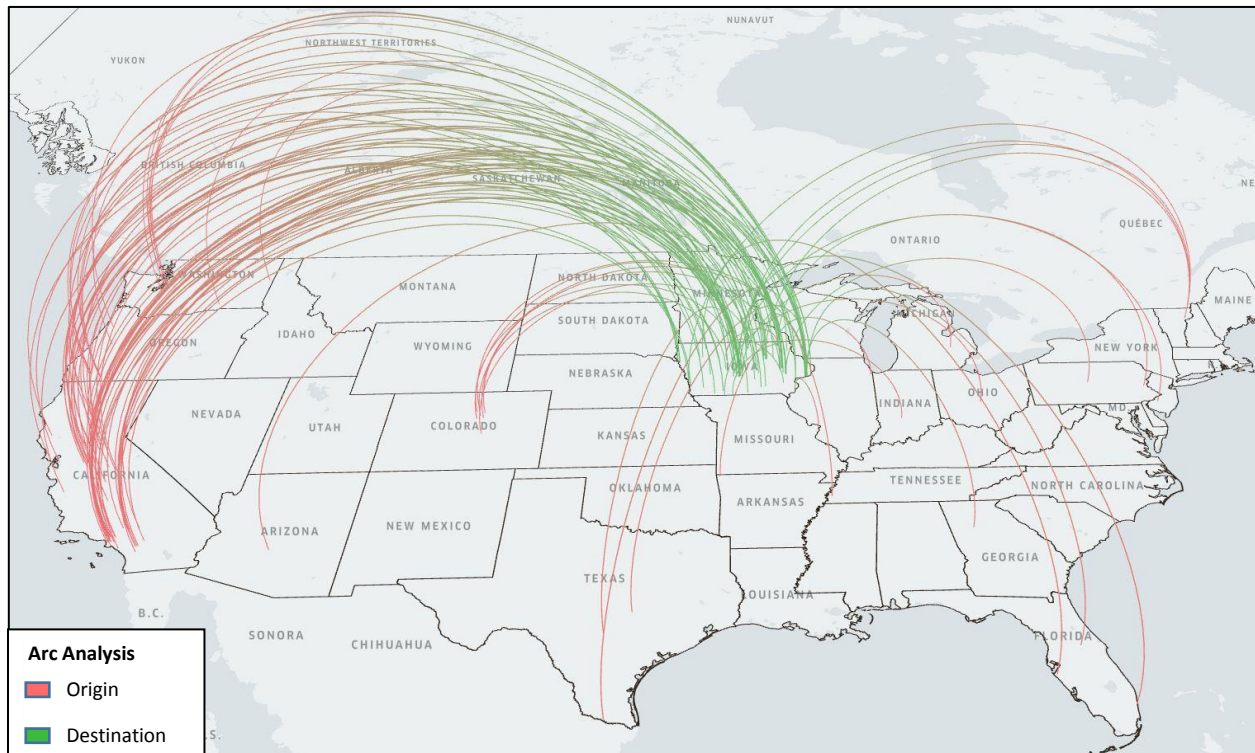


Figure 3: Third Quarter 2018 Marijuana Parcel Seizures Destined for North Dakota

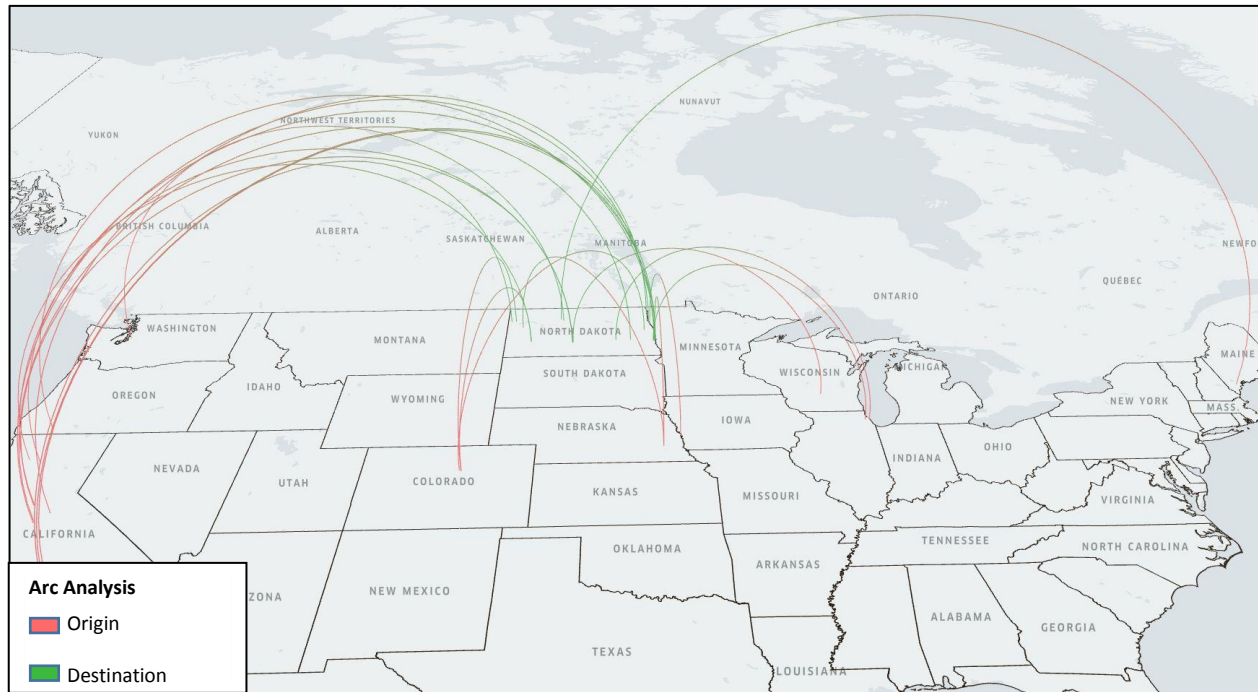
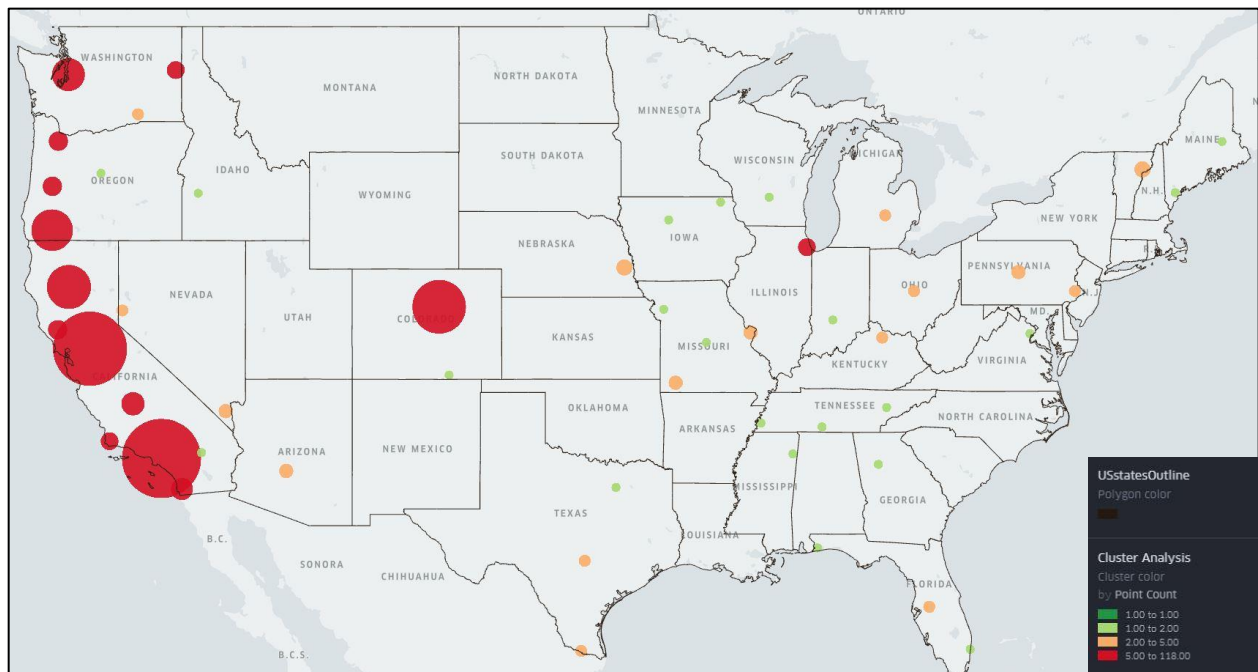


Figure 4: Third Quarter 2018 MO and ND Marijuana Parcel Seizures Origins

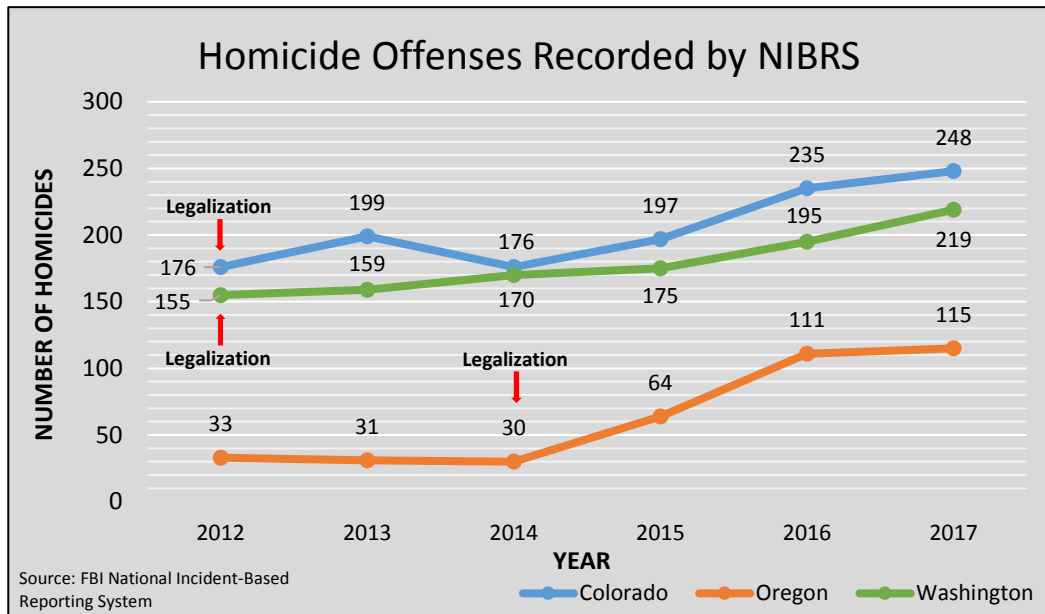


Crime

Legalized marijuana is not causative of lower crime. With the obvious decrease in misdemeanor possession arrests aside, many states observe increases in violent and/or property crime in the years following legalization. Types of crime associated with marijuana use, trafficking, or distribution include: assaults, robberies, burglaries, home-invasions, illegal marijuana grows, money laundering, and possession. It must be noted that the increase in crime is not necessarily a direct result of the legalization of marijuana. That being said, the correlation is evident.

After Colorado's marijuana program became operational, violent crime increased more than 18 percent and property crime increased more than eight percent between 2013 and 2016.³⁴ All crime increased nearly 11 percent during the same time.³⁵ After the commercialization of marijuana in Washington State, records show an increase in crime. Data from the Federal Bureau of Investigation's Uniform Crime Report (UCR) shows an increase in multiple criminal offenses between 2013 (one year prior to marijuana commercialization) and 2016. The number of assaults in Washington State increased by 24 percent; homicide offenses increased 23 percent, and human trafficking offenses increased by 600 percent. Oregon legalized "recreational" marijuana in 2015. Oregon experienced significant increases in crimes against persons between 2014 and 2016. According to Oregon UCR data from this timeframe, there was a 153 percent increase in assaults, 270 percent increase in homicides, 198 percent increase in kidnappings, and 216 percent increase in forcible sex offenses.

**Figure 5: Homicides Collected by
National Incident Based Reporting System (NIBRS)**



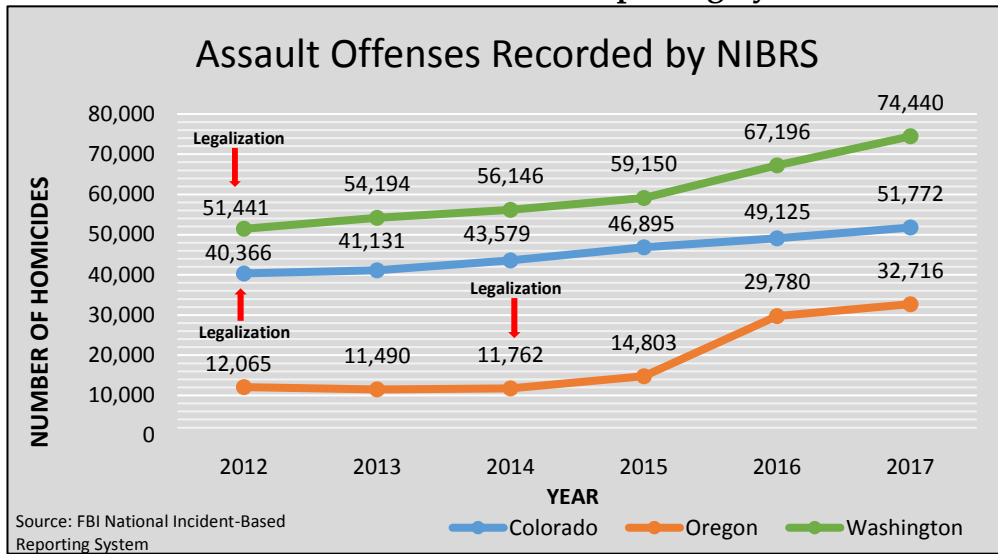
According to 2012-2016 data from the NIBRS: ^{IV}

- The number of homicides in Colorado increased by 41 percent;
- The number of homicides in Oregon increased by 248 percent; ^V
- The number of homicides in Washington increased by 41 percent;
- The number of homicides in the U.S. increased by 41 percent.

^{IV} All NIBRS data for California is unavailable during this time period.

^V NIBRS was not implemented statewide in Oregon; many counties during this time period were still using the UCR system.

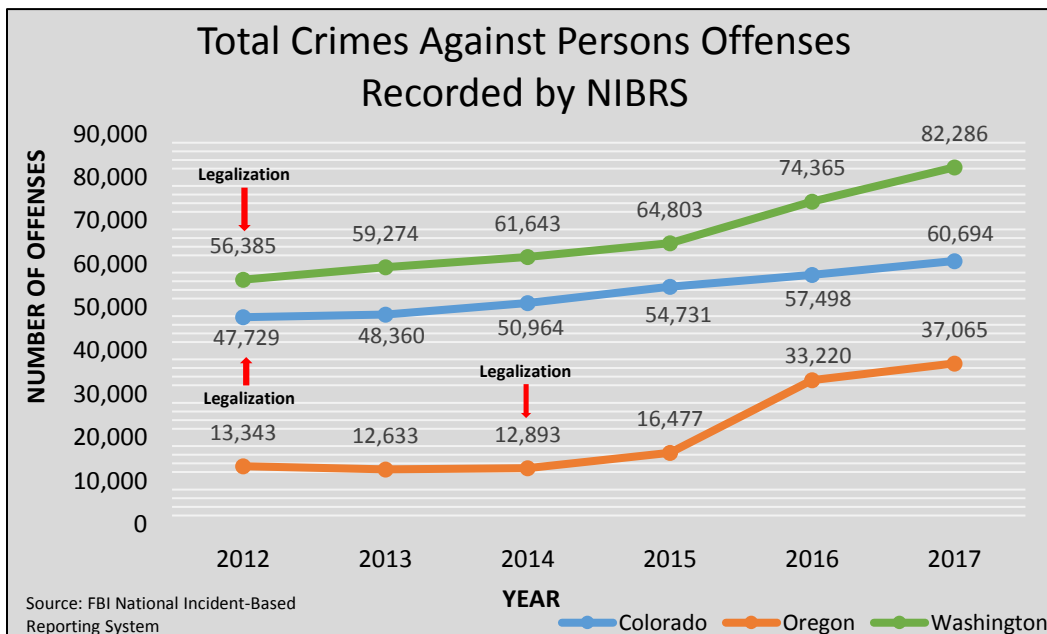
**Figure 6: Assaults Collected by
National Incident Based Reporting System**



According to 2012-2016 data from the NIBRS:

- The number of assaults in Colorado increased by 41 percent;
- The number of assaults in Oregon increased by 171 percent;
- The number of assaults in Washington increased by 28 percent;
- The number of assaults in the U.S. increased by eight percent.

**Figure 7: Total Offenses Collected by
National Incident Based Reporting System**



According to 2012-2016 data from the NIBRS:

- The total number of criminal offenses in Colorado increased by 27 percent;
- The total number of criminal offenses in Oregon increased by 177 percent;
- The total number of criminal offenses in Washington increased by 46 percent;
- The total number of criminal offenses in the U.S. increased by nine percent.

Exploring the relationship between marijuana and crime is difficult as many law enforcement agencies do not record the specific drug(s) involved in any crime within their statistics. Because of this, there is no consistent dataset that represents state and local populations equally. With the passing of “medical” marijuana in Missouri, there must be a baseline set of marijuana-related crimes established prior to the implementation of the marijuana program so that its effects may be measured in the coming years.^{vi}

The following data from the Kansas City Police Department (KCPD) indicates a five percent increase in the number of reports involving marijuana between 2016 and 2018.

All Reports Involving Marijuana				
Year	2016	2017	2018	TOTAL
Number of Reports	4,247	3,993	4,466	12,706

Of the reports that mention marijuana when it was recovered from a crime or taken as evidence, the following data illustrates a 6.7 percent increase between 2016 and 2018.

Recovered Property Involving Marijuana				
Year	2016	2017	2018	TOTAL
Number of Reports	3,536	3,347	3,773	10,656

^{vi} Marijuana-related crime statistics for Iowa or North Dakota could not be obtained during the writing of this report.

The following table displays statistics from the St. Louis Metropolitan Police Department for all crimes where marijuana was seized and tested positive by their crime laboratory. Between 2016 and 2018, the total number of crimes involving marijuana decreased by 3.6 percent. Most major crimes decreased within this period, although there was an increase in the number of marijuana-related homicides, weapons violations, and drug sale charges. It is important to note that since 2013, the City of St. Louis has reformed its penalties for marijuana offenses.

St. Louis Marijuana-Related Crime			
Year	2016	2017	2018
Aggravated Assault	78	70	61
All Drug Possession (Involving MJ)	629	555	532
All Drug Sales (Involving MJ)	5	5	13
Homicide	35	31	49
Robbery	16	14	15
Weapons Violation	219	246	252
All Crimes Involving MJ	1218	1111	1174

Violent and property crimes aside, an unusual form of criminal activity has surfaced around the marijuana trade. Several marijuana-producing states have reported cases of sexual exploitation, kidnapping, and forced labor linked to marijuana grows, particularly in California’s Emerald Triangle region. Migrant workers that travel to the region to work in both legal and illegal growing operations have experienced rape, human trafficking, and other forms of abuse by marijuana growers.³⁶ In addition to crimes against persons and property, the legalization of “medical” and “recreational” marijuana provides a host of opportunities for money laundering, fraud, and other financial crimes.

Marijuana dispensaries are generally cash only businesses. As marijuana remains illegal under federal law, banking and credit institutions generally prohibit marijuana business owners from accepting check or credit card payments from their customers and also prohibit the use of a banking account to store their proceeds. As a result, marijuana businesses typically have a high volume of cash on their premises. The Routine Activities Theory, a widely accepted and commonly cited criminological theory, suggests that the organization of predictable activities in society create opportunities for crime.³⁷

According to this theory, crime occurs when a motivated offender, suitable target, and lack of capable guardianship all intersect in time and space.³⁸ In the context of marijuana businesses, the customer or the dispensary represent a suitable target because of their cash on hand. A lack of guardianship occurs if the dispensary lacks adequate security. The business practices of marijuana dispensaries make them particularly susceptible to the three elements of this theory, which represents an increased risk of criminal activity surrounding the industry.

Traffic Fatalities and Impaired Driving

Like alcohol, driving under the influence of marijuana endangers not only the driver and passengers, but everyone they encounter. Marijuana has measureable effects that impair the ability to drive and react properly in critical situations.^{39 40} The National Highway Traffic Safety Administration's (NHTSA) Drug and Alcohol Crash Risk Study found that marijuana users are 1.25 times more likely to be involved in auto crashes than drug-negative drivers.^{41 VII} Because there is no roadside device to detect THC at this time, many law enforcement agencies utilize Drug Recognition Experts (DREs) who base arrests on indications of impairment. Arrests based on DRE opinions alone are not accepted in all jurisdictions and may require a toxicology screening.

In California, the number of drivers who tested positive for marijuana increased by 22 percent between 2005 and 2014.⁴² During the same time period, the number of fatalities involving a driver who tested positive for marijuana increased by 17 percent.⁴³ According to data from the Fatality Analysis Reporting System, the number of fatalities involving a driver testing positive for marijuana in California increased by 34 percent between 2005 (n=273) and 2015 (n=366).⁴⁴

^{VII} This number reflects the unadjusted odds ratio of the association between drug class and category and crash risk, Table 28 of the NHTSA's Drug and Alcohol Crash Risk Study.

California Traffic Deaths Related to Marijuana When a <u>Driver</u> Tested Positive for Marijuana			
Crash Year	Total Statewide Fatalities	Fatalities with Drivers Testing Positive for Marijuana	Percentage of Total Fatalities
2008	3434	234	10.40%
2009	3090	196	11.70%
2010	2720	192	13.20%
2011	2816	212	15.10%
2012	2966	266	9.50%
2013	3107	272	16.90%
2014	3074	252	15.70%
2015	3387	318	17.70%
2016	3623	N/A	N/A
2017	N/A	N/A	N/A

After “recreational” marijuana was legalized in Colorado, marijuana-related traffic deaths increased 151 percent while overall Colorado traffic deaths increased by 35 percent.⁴⁵ Fatalities involving drivers who tested positive for marijuana rose from 55 in 2013 to 138 in 2017. There were 481 total traffic fatalities across the state in 2013. Eleven percent of those fatalities involved drivers who tested positive for marijuana. In 2017, total traffic fatalities rose to 648, with 21 percent of drivers testing positive for marijuana.

46

Colorado Traffic Deaths Related to Marijuana When a <u>Driver</u> Tested Positive for Marijuana			
Crash Year	Total Statewide Fatalities	Fatalities with Drivers Testing Positive for Marijuana	Percentage of Total Fatalities
2008	548	36	6.57%
2009	465	41	8.82%
2010	450	46	10.22%
2011	447	58	12.98%
2012	472	65	13.77%
2013	481	55	11.43%
2014	488	75	15.37%
2015	547	98	17.92%
2016	608	125	20.56%
2017	648	138	21.30%

Among impaired driving fatalities in Oregon, analysis of toxicology results between 2010 and 2015 show an average of five percent of drivers involved in driving fatalities tested positive for THC.⁴⁷ During the same period, only 38 percent of traffic fatalities underwent toxicology screening.⁴⁸ Information from Oregon State Police claims that the total number of DRE investigations between 2014 and 2016 that resulted in a marijuana-impaired driving outcome increased by 66 percent.^{VIII 49}

Marijuana is the most-cited drug detected in fatal crashes in Iowa, according to 2016 data from the Governors Highway Safety Association and the Iowa Department of Transportation.⁵⁰ In 2016, 51 percent of drug-related fatal crashes in Iowa involved marijuana, compared to 41 percent nationwide.⁵¹ Marijuana-related traffic fatality data are unknown for Missouri and North Dakota. Missouri does not track the specific drug(s) involved in a DUID case. Data was unavailable for North Dakota at the time of this report.

^{VIII} All DRE examinations were validated by toxicological results; there were a total of 991 positive results by 2016.

Chapter 2: Accessibility and Use

Chapter Summary

As California, Colorado, Oregon, and Washington saw a proliferation of “medical” marijuana dispensaries, they also saw a corresponding increase in marijuana use among all ages, as well as a decrease in the perception of risk. This likely has, and will continue to, lead to increasing use, especially among youth aged 12 to 17.^{52 53} Using these states as a predictive model, it is logical to conclude that when access to “medical” marijuana becomes available, both youth and adult marijuana use will increase in Missouri, North Dakota, and surrounding areas.

State Estimates of Youth Marijuana Use

According to data from the Substance Abuse and Mental Health Services Administration (SAMHSA), states with legalized “recreational” and/or “medical” marijuana moved up in the national ranking of past month marijuana usage by those aged 12 to 17 from 2013 to 2014.⁵⁴

In several western states with “medical” and “recreational” marijuana laws, the increase in **past month** marijuana use rates among youth aged 12-17 is apparent in the following 2017 National Survey on Drug Use and Health (NSDUH) data:

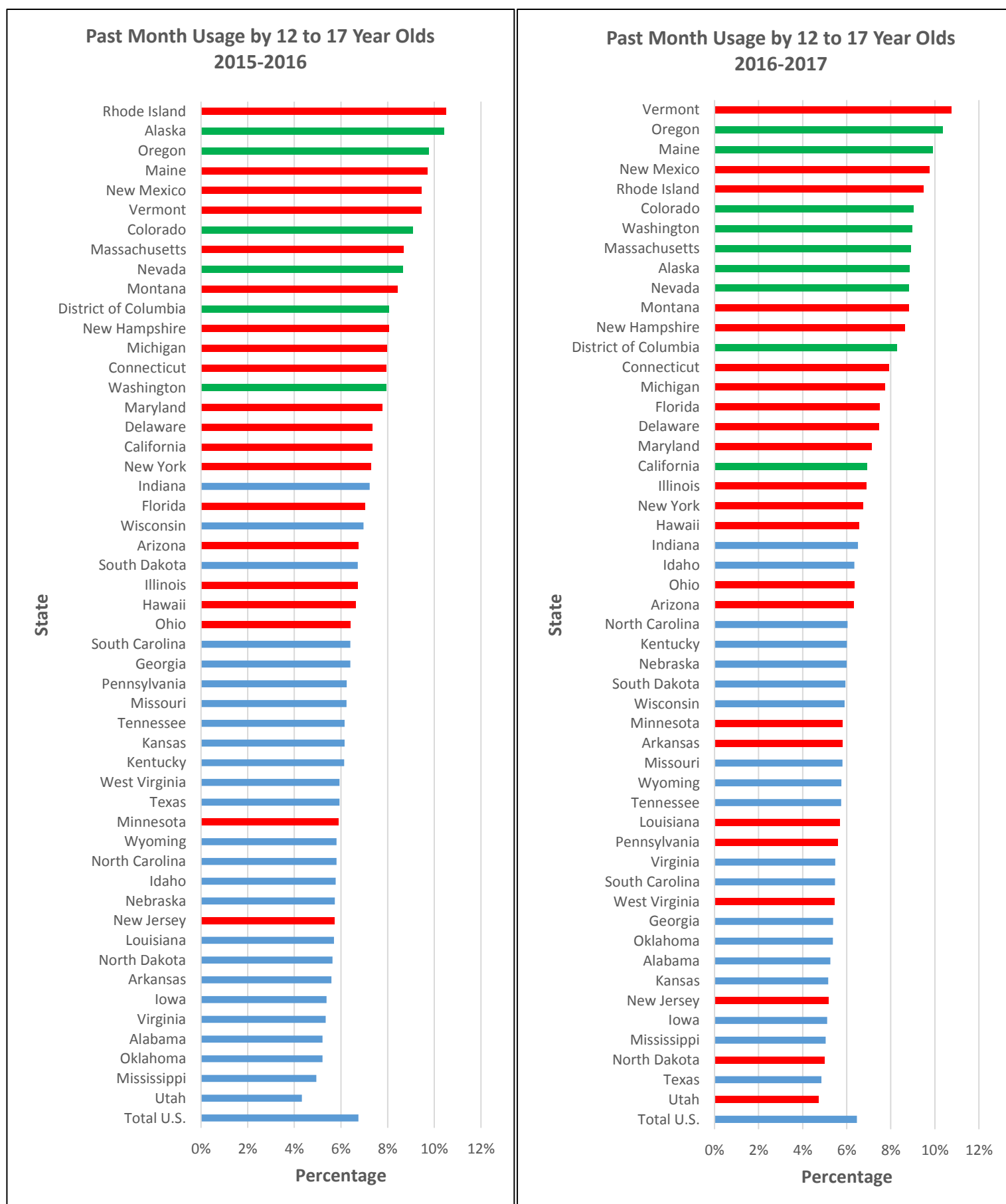
- California was seven percent higher than the U.S. average;⁵⁵
- Colorado was 40 percent higher than the U.S. average;⁵⁶
- Oregon was 60 percent higher than the U.S. average;⁵⁷
- Washington was 39 percent higher than the U.S. average.⁵⁸

Youth aged 12-17 **past year** use in:

- California was nine percent higher than the national average;⁵⁹
- Colorado was 39 percent higher than the national average;⁶⁰
- Oregon was 40 percent higher than the national average;⁶¹
- Washington was 23 percent higher than the national average.⁶²

Many other states with forms of marijuana legalization display increases in marijuana use among both youth and adult populations.⁶³ Increases in drug availability consistently translate to increases in drug use. Figure 8 on the following page compares past month marijuana usage by those aged 12 to 17 in 2015-2016 and 2016-2017. States with “medical” or “recreational” marijuana have higher youth use rates than states without legalized marijuana access. States with a “recreational” marijuana program are represented with a green bar. States with a “medical” marijuana program are represented with a red bar. States with neither a “medical” or “recreational” marijuana program are represented with a blue bar.

Figure 8: Past Month Marijuana Usage by 12 to 17 Year Olds 2015-2017



State Estimates of Adult Marijuana Use

SAMHSA data illustrates that adult past year and past month marijuana use for California, Colorado, Oregon, and Washington is significantly higher than the U.S. average. The SAMHSA's 2017 NSDUH indicates that adult **past year** use in:

- California was nine percent higher than the U.S. average;
- Colorado was 39 percent higher than the U.S. average;
- Oregon was 40 percent higher than U.S. average, and
- Washington was 23 percent higher than the U.S. average.

Adult **past month** use in:

- California was seven percent higher than the U.S. average;
- Colorado was 39 percent higher than the U.S. average;
- Oregon was 40 percent higher than U.S. average, and
- Washington was 23 percent higher than the U.S. average.

Figure 9: NSDUH Marijuana Use, Ages 12-17

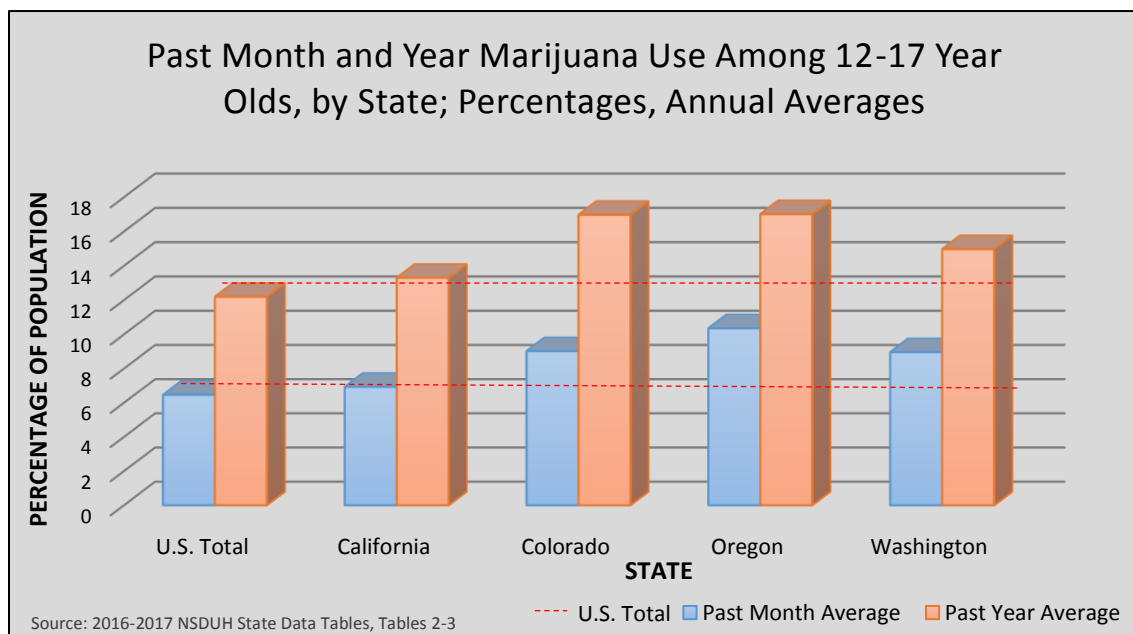
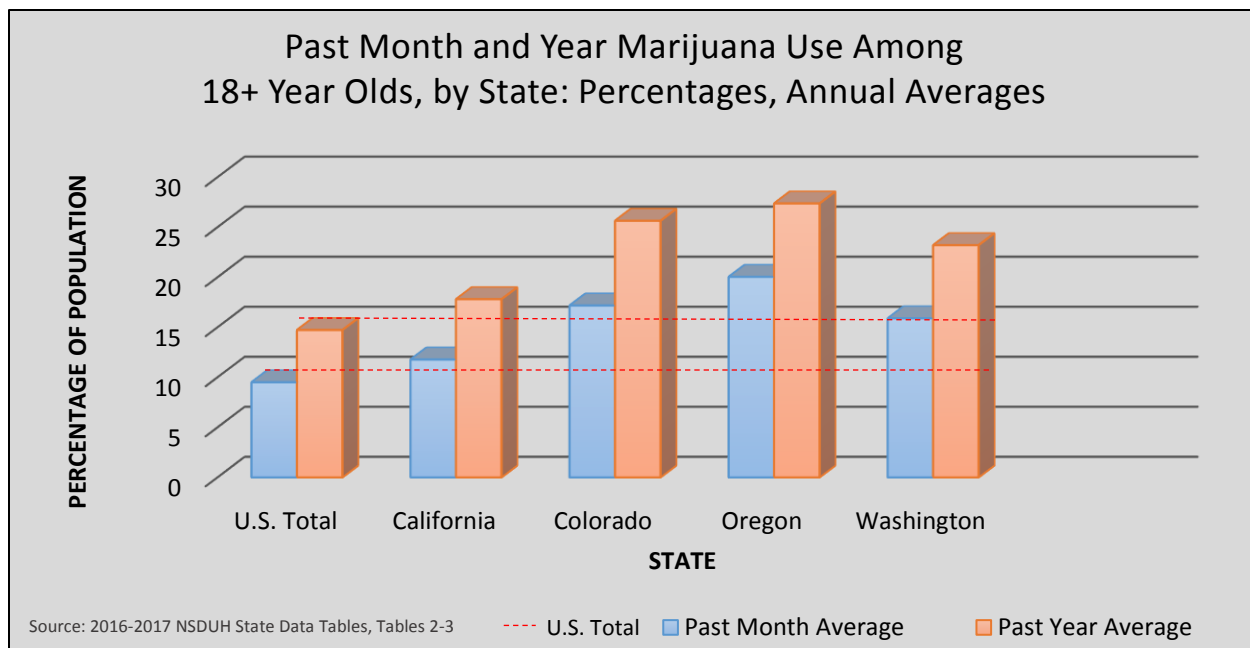


Figure 10: NSDUH Marijuana Use, Ages 18+



In addition to the nationwide statistics collected by the NSDUH, a comprehensive study from Emory University's Rollins School of Public Health examined the effects of "medical" marijuana laws (MMLs) on alcohol and drug use. The researchers tested the effects of MMLs in seven states and observed a 16 percent increase in the probability of marijuana use, a 12 to 17 percent increase in marijuana use frequency, and a 15 to 27 percent increase in the probability of marijuana dependence among those aged 21 and older.^{64 65} The study also found an increase in marijuana use initiation among those aged 12 to 20. The states with MMLs also saw a higher frequency of binge drinking among those aged 21 or older.⁶⁶

The Alaskan Example

Alaska's experiment with legalized marijuana in the 1970s demonstrated that an increase in access led to an increase in use. In 1975, the Alaskan Supreme Court ruled that the state could not restrict an adult's possession of marijuana for individual consumption in the home.⁶⁷ Following the ruling, Alaska state law allowed people over the age of 19 to possess up to four ounces of marijuana in their homes without penalty. The ruling initiated widespread marijuana use among the Alaskan public.

In 1988, a University of Alaska study that examined drug use behaviors in adolescents in grades seven to 12 publicized its findings that marijuana use among Alaskan adolescents was twice (51.6 percent) the national average (23.7 percent) for the same age groups.⁶⁸ Despite the fact that marijuana use and possession by minors in Alaska was prohibited, law enforcement admitted the difficulty of keeping it out of the hands of school children.⁶⁹

Seven years after the initial Alaska Supreme Court ruling, the National Institute on Drug Abuse revealed that approximately 72 percent of Alaskan high school students had used marijuana at least once. The equivalent figure nationwide was 59 percent.⁷⁰ Alaska's residents voted again in 1990 to re-criminalize marijuana. In 1998, voters legalized medical marijuana with the stipulation that one's supply must come from personal or in-home cultivation, rather than a dispensary. Alaska later legalized "recreational" marijuana with Ballot Measure 2 in 2014.

Chapter 3: Impacts on Health

Chapter Summary

This chapter will examine public health data related to marijuana use. This includes marijuana-related emergency department visits and hospitalizations, THC extraction laboratories, and pesticide usage. The following information was collected from public health and law enforcement agencies.

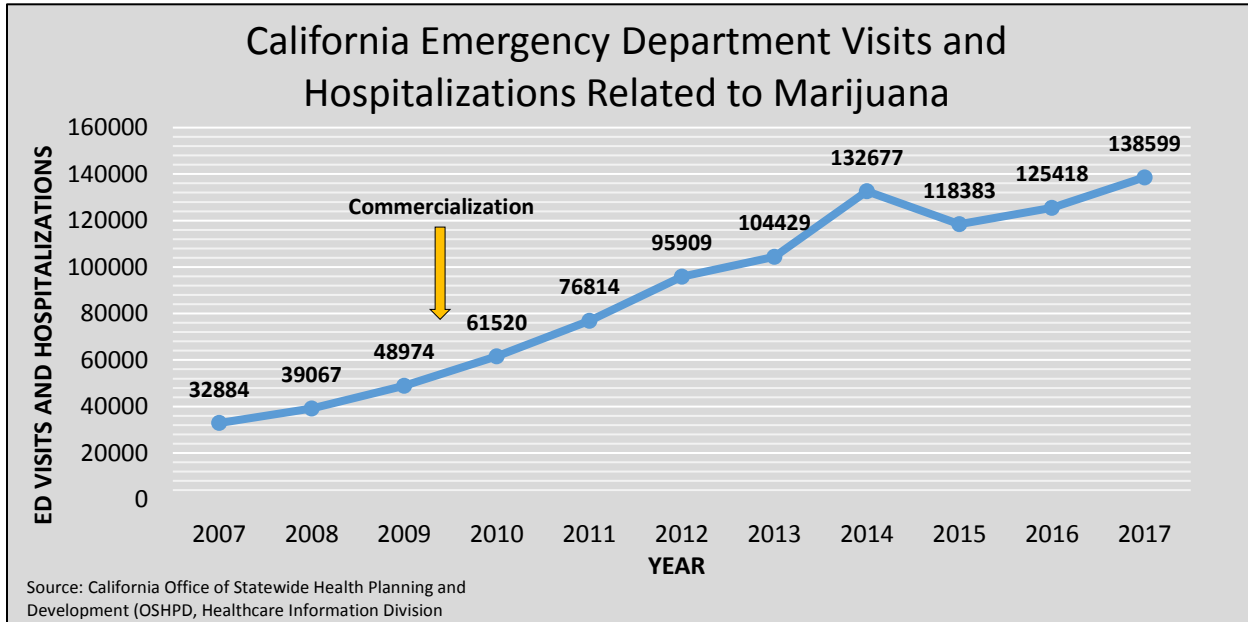
- California, Colorado, and Oregon all experienced increases in marijuana-related emergency department visits in the years following the commercialization and/or legalization of marijuana.
- THC extraction labs present their own risks to public health. The process, which carries a significant risk of explosion, yields highly potent marijuana concentrates. In 2016, 79 percent of nationally reported clandestine THC extraction labs occurred in California.⁷¹
- The limited information available from state agencies regarding pesticide testing poses health risks to consumers and makes it difficult to calculate rates of marijuana contamination.

Emergency Room Visits, Hospitalizations, and Poison Center Data

Many states that legalize “medical” and/or “recreational” marijuana report increases in marijuana-related exposures among children and adults, many of which result in emergency department hospital visits. This increase is generally attributed to the increase in marijuana’s availability. Marijuana use disorder, overdoses, and accidental ingestion are the driving factors of marijuana-related hospital admissions.

California saw a 380 percent increase in emergency department visits between 2005 and 2016 for any related marijuana abuse; this includes primary and secondary diagnoses.⁷² Among children aged 0 to 5, marijuana-related exposures resulting in hospital admittance increased by more than 513 percent between 2005 and 2015. Marijuana-related exposures of those aged 6 to 19 that resulted in hospital admittance increased by 139 percent during the same period of time. For adults aged 20 and older, there was a 64 percent increase in the number of marijuana-related exposures between the years of 2005 to 2009 and 2010 to 2014.⁷³

Figure 11: California Emergency Department Visits and Hospitalizations



Colorado also saw an increase in marijuana-related hospitalizations and emergency department (ED) visits. Data from the Colorado Hospital Association indicates that emergency department visits for marijuana abuse, dependence, use or poisoning increased from 8,198 cases in 2011 to 18,257 in 2014.⁷⁴ The total number of ED visits has increased by 48 percent since legalization. The total number of hospitalizations in Colorado have increased by 98 percent since legalization.

Figure 12: Colorado Emergency Department Visits

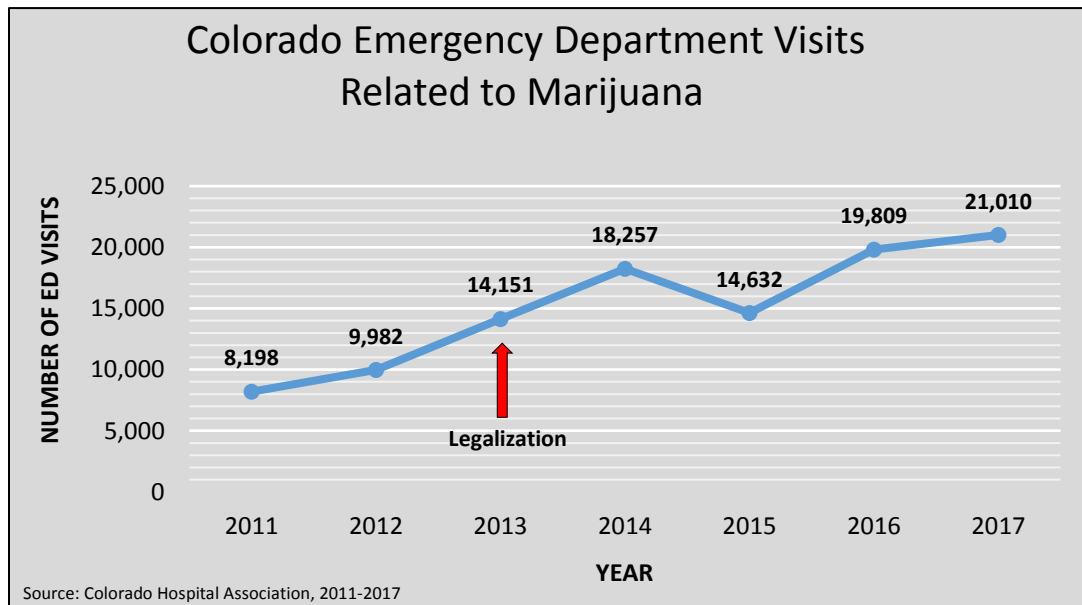
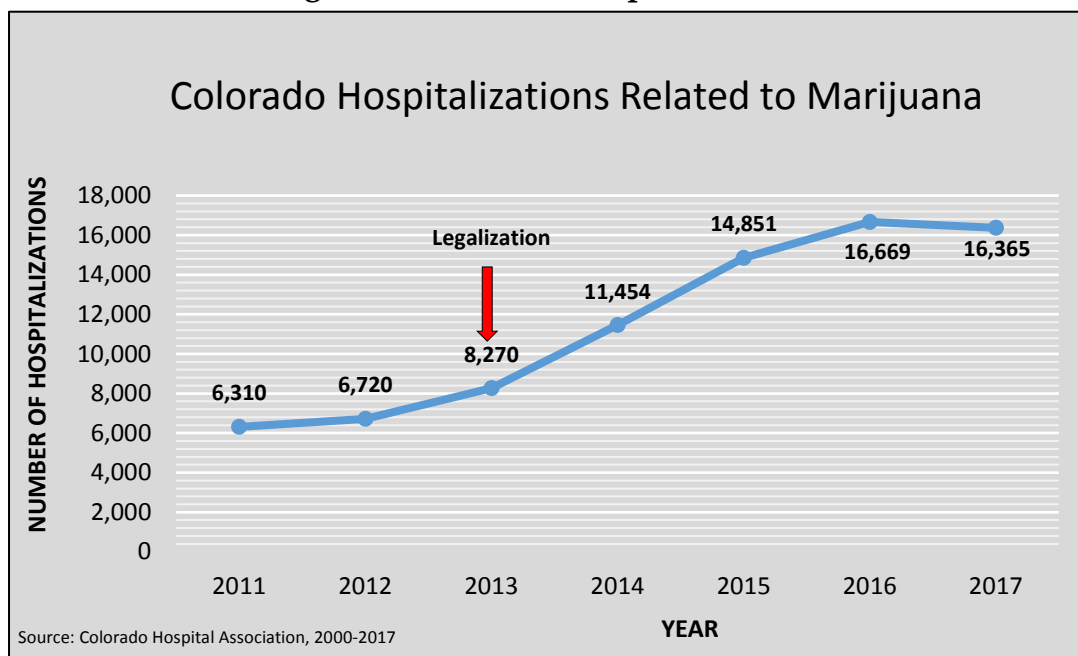
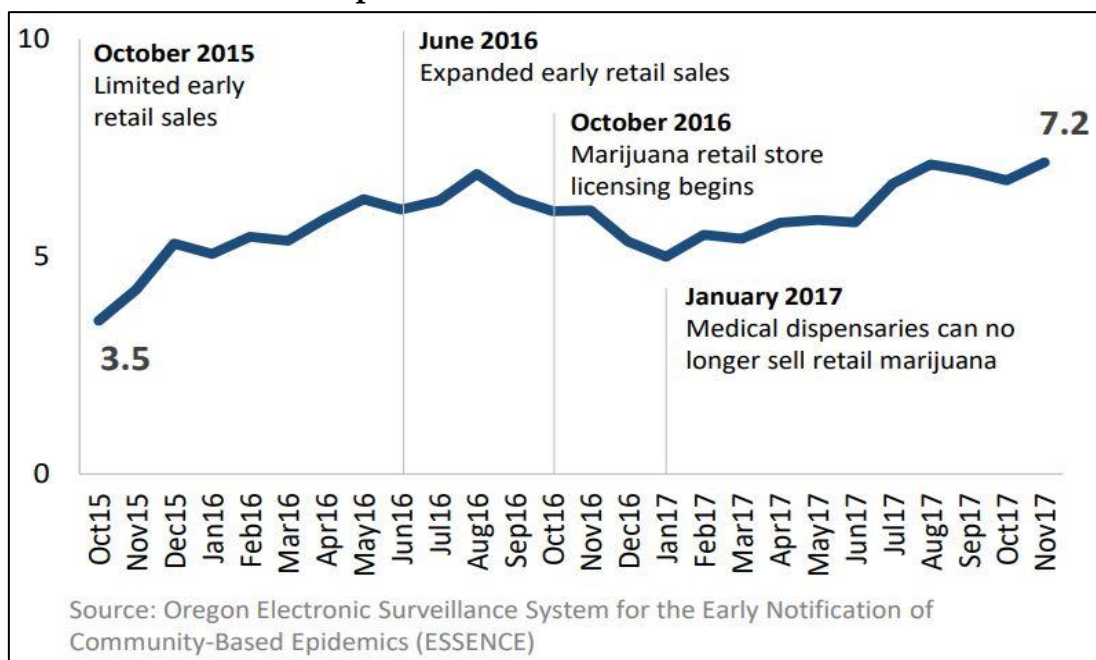


Figure 13: Colorado Hospitalizations



Information from Oregon's Electronic Surveillance System for the Early Notification of Community-based Epidemics (ESSENCE) states that the rate of marijuana-related diagnostic codes in emergency department visits rose 85 percent between October 2015 and October 2016.⁷⁵ The majority of the patients in that data sample were between 18 and 25 years of age. From October 2015 through November 2017, the rate of ED visits with marijuana-related codes increased from 3.5 per 1,000 visits to 7.2 per 1,000 visits. There were 25,274 marijuana-related ED visits during the 26-month timeframe.⁷⁶

**Figure 14: Monthly Marijuana-Involved
ED Visits per 1,000 Visits, Oct. 2015 – Nov. 2017**



National emergency department visits and hospitalizations involving marijuana are difficult to measure due to the way hospitals keep patient records. One nationwide study from the Journal of Addiction Medicine showed that emergency department visits that involved the use of marijuana had increased from 51 to 73 per 100,000 patients between 2004 and 2011.⁷⁷ Unfortunately, more recent figures are unavailable as the Drug Abuse Warning Network, from which the study gathered information, was discontinued in 2011.

THC Extraction Labs

Butane hash oil (BHO) extraction is a popular method of extracting the desirable compounds from raw marijuana in order to create marijuana concentrates. The end result of the extraction process, referred to as BHO, is used in the development of concentrates like honey oil, wax, shatter, and other high-THC formulations. Certain states with marijuana legislation restrict concentrate production to licensed manufacturing facilities, while others allow individuals to conduct extraction techniques for personal use. Regardless of the legality, BHO extraction can produce devastating results if not conducted properly. Clandestine THC extraction laboratories are risky as the solvents used in the extraction process, (alcohol, butane, propane, and hexane) are extremely flammable and can result in an explosion.

Clandestine extraction lab explosions can cause environmental damage, personal injury, and death. From July 2015 through January 2018, the Legacy Emmanuel Oregon Burn Center treated 71 burn victims as a result of BHO explosions, costing an estimated \$9.6 million.⁷⁸ During that same time period, law enforcement discovered 64 clandestine extraction labs, 21 of which resulted in either a fire or explosion. There were more THC extraction labs discovered in California in 2015 and 2016 than methamphetamine conversion labs, illustrating the increasing popularity and demand for marijuana concentrates.⁷⁹ Clandestine THC extraction labs pose a significant threat to public safety and endangers not only those who engage in the clandestine extraction techniques, but innocent victims as well.

Pesticide Use

Researchers and federal authorities are finding increasing amounts of harmful pesticides used in marijuana cultivation around the country. As with any crop, marijuana cultivators use pesticides to protect their plants from harmful insects, animals, and other pests. Many of these pesticides, however, are harmful to humans, wildlife, and the environment and are either being used without proper authorization from state authorities or are illegal for use in the United States.

Much of the legislation responsible for the establishment of legalized marijuana requires pesticide testing for retail sales of marijuana. The current regulations and testing protocols used by state marijuana agencies are imperfect and allow for significant amounts of product tainted with unauthorized or unsafe levels of pesticides to slip through to sale. Oregon's marijuana program has failed to meet a wide array of mandatory state inspections. The testing system it uses to ensure that retail marijuana is free of pesticides, mold, and heavy metals has proven to be inadequate, although the state routinely adjusts its standards for what qualifies as passing levels. Colorado has not yet implemented pesticide regulations due to regulatory delays. Other states, like Washington and California, are still establishing pesticide regulations on commercial marijuana.

In 2017, the Oregon Liquor Control Commission issued its first recall for "recreational" marijuana products after samples were found to contain levels of the pesticide pyrethrin that were above the state limit.⁸⁰ In November 2018, public health agencies in Colorado issued a recall of 23 products from retailer Colorado Wellness Center LLC dba Lush due to their use of non-approved pesticides.⁸¹ That same month,

the Colorado Department of Health and Environment issued a second recall from another retailer, Boulder Botanics, for unsafe levels of bifenthrin and diuron in their products.⁸²

Pesticide contaminated-marijuana often goes unchecked at illegal grow sites. Dr. Mourad Gabriel of the Integral Ecology Research Center states that the highly toxic pesticide carbofuran was found at 72 percent of the illegal grow sites he tested in California during 2017.⁸³ Although “medical” and “recreational” marijuana are both legal in California, criminals utilize public land in order to stage clandestine marijuana growing operations. Marijuana from these operations is typically trafficked to Midwestern and Eastern states where the demand for high-potency marijuana exists.

Contents of Marijuana Smoke

Smoke is harmful to lung health no matter the contents. Toxins and carcinogens are released when a material combusts. Marijuana smoke shares many of the same carcinogens and tumor promoters as tobacco smoke and has been found to contain three times as much tar as tobacco smoke.^{84 85} Marijuana is generally smoked differently than tobacco as its users tend to inhale deeper and hold their breath longer than tobacco users.⁸⁶ This leads to a greater exposure of tar. In addition to the lungs, smoking marijuana can affect the immune system because it damages alveolar macrophages, which help remove dust and bacteria from the lining of the lungs.⁸⁷

Chapter 4: Potency

Chapter Summary

This chapter will examine the potency of modern marijuana in comparison to that of the past, as well as the variations in cannabinoids amongst different forms of marijuana.

- According to the University of Mississippi's Potency Monitoring Program, the average percentage of THC found in samples of marijuana seized by the DEA increased by 199 percent between 1995 and 2014.⁸⁸ THC levels were measured at approximately 3.96 percent in 1995 and increased to approximately 11.84 percent in 2014.⁸⁹
- During that same time, the average percentage of CBD decreased 48 percent.
 - This is worth noting as CBD is more commonly associated with the "medical" benefits of marijuana while THC is more commonly associated with the drug's "high".⁹⁰
- Beginning in 2001, the average level of CBD steadily declines while the average level of THC steadily increases.
- The levels of THC within edibles can vary across a single product or entire batches. This makes it difficult for users to estimate how much THC they consume, increasing the risk of overdose and adverse reactions.⁹¹

Modern Marijuana

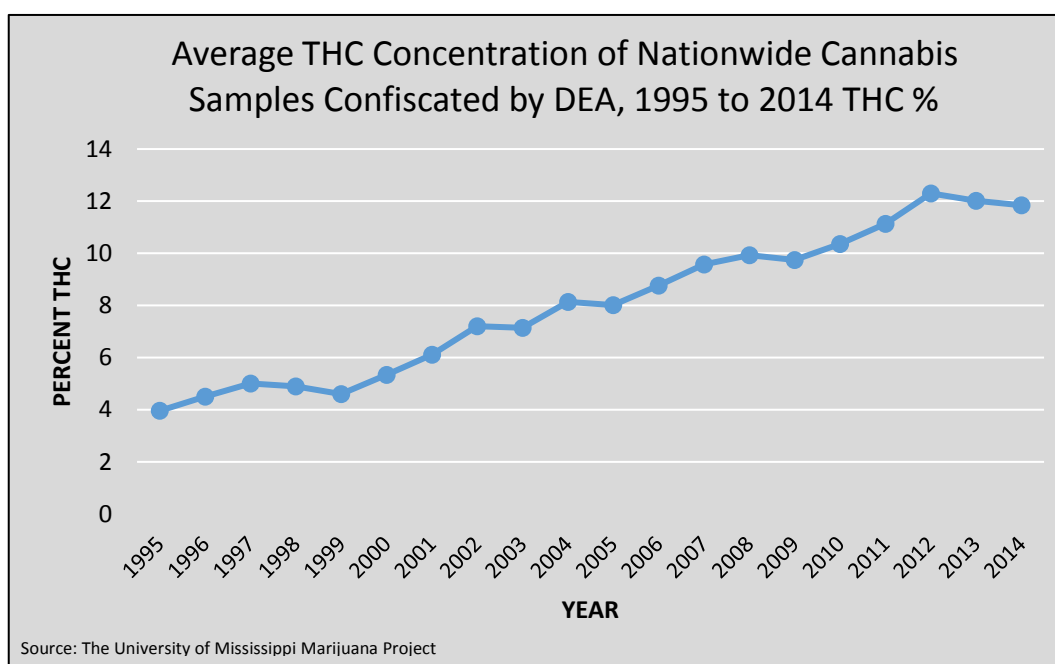
Modern marijuana's potency is far greater than that of the past and has steadily increased since the 1990s. In the passing of their marijuana laws, most states failed to set limits on the level of THC allowed in marijuana products, with highly potent strains being the corollary. The concentration of THC and CBD varies depending on the different parts of the plant, the strain, and the form of marijuana (flower, oil, wax, tincture, edible, etc.). THC concentration may vary from insignificant amounts in hemp varieties of marijuana to very high amounts in flower and concentrates.

The University of Mississippi's Potency Monitoring Program has assisted federal agencies in planning drug control and public health strategies through the continued

analysis of marijuana potency. Law enforcement agencies around the country routinely send the program samples of confiscated marijuana seized through law enforcement operations. The samples are analyzed for their cannabinoid profiles and the results are made accessible to various government agencies. This information is a valuable tool in determining the fluctuations of THC levels within marijuana.

Figure 15 displays the average THC concentration of marijuana samples that were confiscated by the DEA. Between 1995 and 2014, the average percentage of THC increased 199 percent.

Figure 15: THC Potency Trends

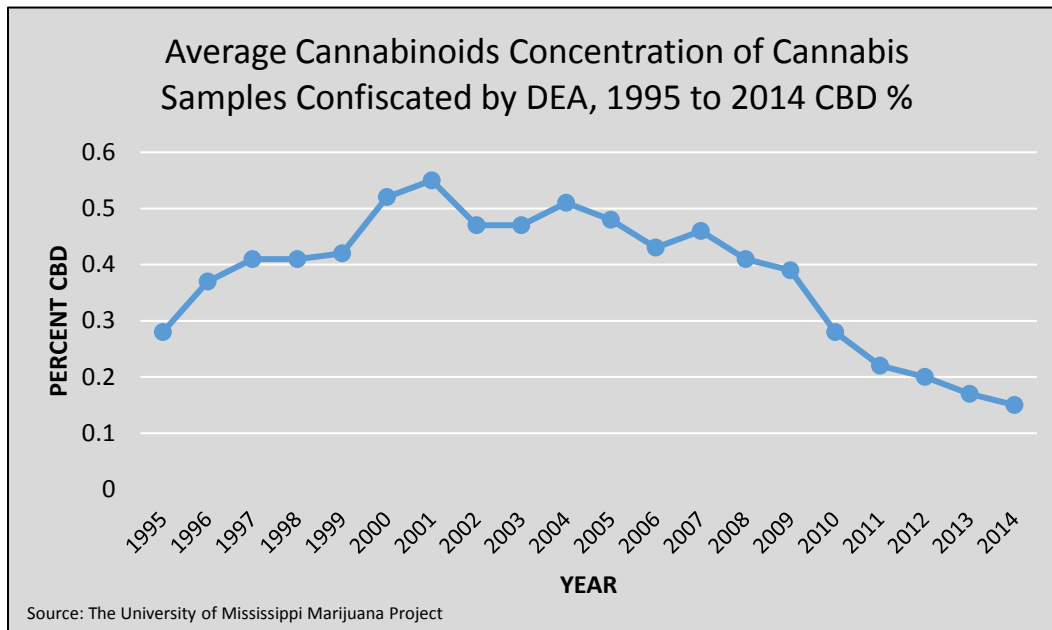


In 2015, the average THC potency of marijuana flower at one Seattle-based dispensary was 21.24 percent, compared to the national average of 11.16 percent.⁹² In 2017, the average THC potency of tested marijuana sold in Colorado dispensaries was 19.6 percent for flower and 68.6 percent for concentrate products.⁹³

Figure 16 displays the average CBD concentration of marijuana samples confiscated by the DEA. Between 1995 and 2014, the average percentage of CBD decreased 48 percent. Beginning in 2001, the average level of CBD steadily declines while the average level of THC steadily increases. This is contradictory to the idea that marijuana is medicine. While it is suggested that THC may be effective in reducing neuropathic pain and nausea, and increasing appetite in patients diagnosed with certain

forms of cancer, the majority of the “medicinal” effects associated with marijuana are believed to be due to CBD.^{94 95}

Figure 16: CBD Potency Trends



Edible Marijuana

The many formulations of marijuana extracts used in the edible industry prove to be a regulatory challenge for policymakers. The effects from edible marijuana products differ from smoked marijuana because of the way the cannabinoids metabolize in the body. The levels of THC within edibles can vary across a single product or across batches developed at different times. This makes it challenging for users to estimate how much THC they consume, increasing the risk of overdose and adverse reactions.⁹⁶ One of the major differences between edibles and other forms of marijuana, such as flower and concentrate, is the disparity in regulation. Regulatory measures concerning edible marijuana products differ widely from state to state, with varying degrees of success.

Colorado, which released its retail marijuana code in 2015, mandated that no single-serving of a marijuana-infused edible may contain more than 10 milligrams of THC.⁹⁷ This did little to regulate edible manufacturers, as THC-infused foods with a much higher THC content adjusted their serving sizes. For example, prior to the issuance of this code, an entire gummy candy may have represented one serving of 50 milligrams of THC whereas now the serving size would claim that there are five



THC-Infused Gummies
Source: <https://tinyurl.com/y8ahbuhu>

servings per gummy candy. With serving sizes as imprecise as one-fifth of a gummy bear, it is difficult to imagine a consumer adhering to them. Washington State also defines a single serving of an edible as containing no more than 10 milligrams, with many of the same lapses in regulation as Colorado.

An Oregon Health Authority committee set a potency limit for edible marijuana products at five milligrams of THC per serving. The committee also ruled that no more than 50 milligrams, or 10 servings, of THC is allowed per package.

Chapter 5: Marijuana as an Opioid Alternative

Chapter Summary

Proponents of marijuana legalization argue that it may solve the opioid epidemic by reducing patient reliance on opioids for managing pain. This chapter will investigate the relationship between legalized marijuana access, chronic pain, and opiate/opioid abuse. There are theories that marijuana successfully treats both opioid/opiate use disorder and chronic pain. The examination of the research purporting these claims reveals the following:

- The studies utilizing Medicare prescription data cannot demonstrate that legalized marijuana access is responsible for a decrease in opioid overdose deaths or that patients reformed their drug-taking behavior because their pain was better managed by marijuana.^{98 99}
- Every state with an operational “medical” marijuana program in 2015 that reported overdose death data to the Centers for Disease Control and Prevention (CDC) experienced an increase in drug overdose deaths involving synthetic opioids between 2015 and 2017.¹⁰⁰
- Both the CDC and FDA state that there is not enough evidence that supports marijuana as an opioid alternative at this time.

Research

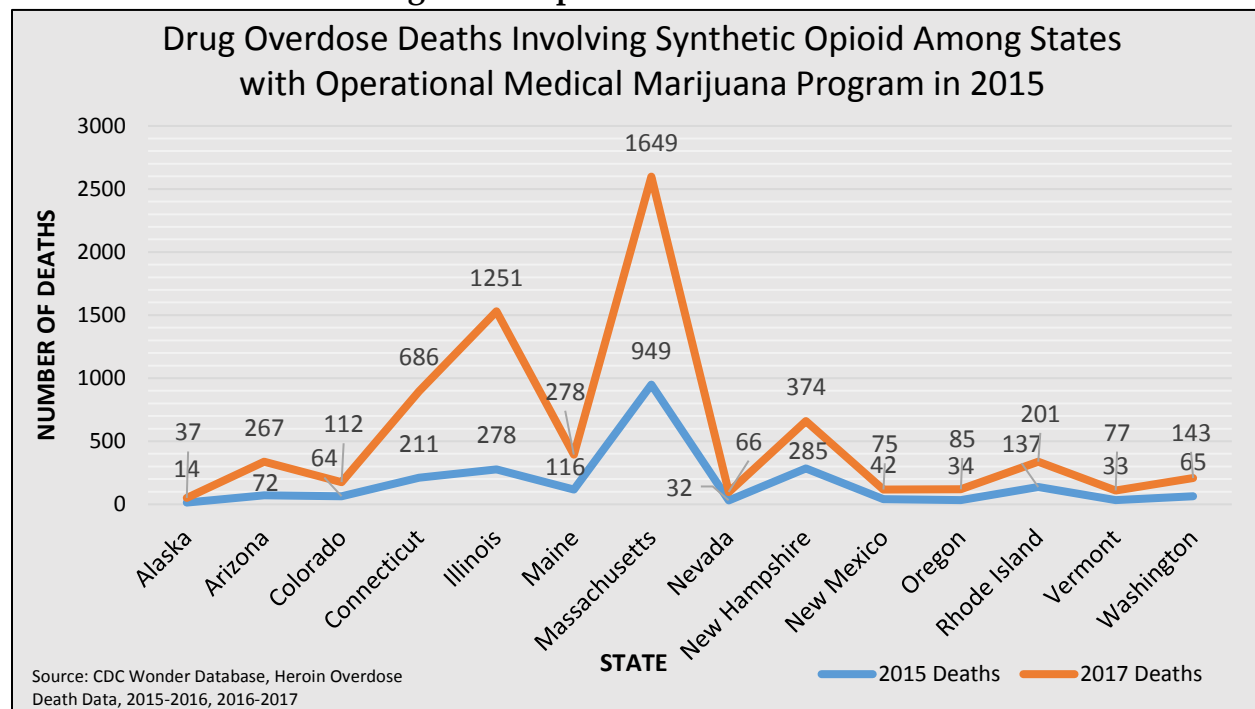
Proponents of “medical” marijuana often cite several studies that show a correlation between states with operational “medical” marijuana programs and those programs’ lower mean annual opioid overdose mortality rate, compared to that of states without an operational “medical” marijuana program. Marijuana advocacy groups also tout marijuana’s effectiveness in aiding patients with chronic pain and a host of other medical conditions.

One study that purports the potential benefits of “medical” marijuana legalization found that Medicare Part D prescriptions filled for all opioids decreased in the states with “medical” marijuana laws.¹⁰¹ Another study analyzed Medicaid prescription data and determined “medical” marijuana laws and “recreational” marijuana laws were linked with lower opioid prescribing.¹⁰² However, these studies are population-based and

cannot demonstrate that the legalization of “medical” marijuana caused the decrease in opioid overdose deaths or that pain patients reformed their drug-taking behavior.¹⁰³ The studies provided no information on whether individuals who use marijuana for pain have a higher or lower risk of opioid mortality.

Contrary to the information cited by “medical” marijuana advocacy groups, Colorado has experienced a 33 percent increase in opiate/opioid mortality rates since it legalized marijuana in 2013.¹⁰⁴ Deaths from heroin increased 93 percent from 2013 to 2016 and decreased seven percent from 2016 to 2017.¹⁰⁵ In fact, according to data from the CDC’s Wonder database, every state with an operational “medical” marijuana program in 2015 that reported overdose death data to the CDC experienced an increase in drug overdose deaths involving synthetic opioids between 2015 and 2017.^{IX 106}

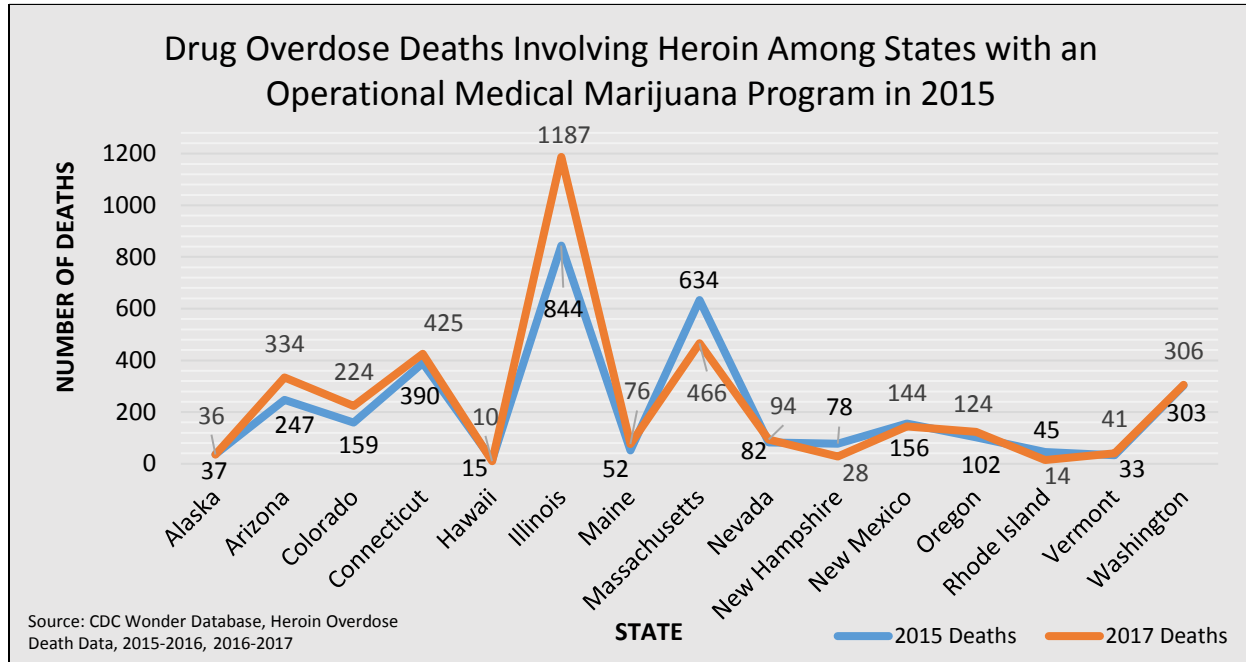
Figure 17: Opioid Overdose Deaths



^{IX} Of the 20 U.S. states with an operational “medical” marijuana program in 2015, six states were excluded from this statistic as they did not meet the CDC’s inclusion criteria for one or more years in the timeframe.

^X Of the 20 U.S. states with an operational “medical” marijuana program in 2015, five states were excluded from this statistic as they did not meet the CDC’s inclusion criteria for one or more years in the timeframe.

Figure 18: Heroin Overdose Deaths



Another recent study examining the effect of cannabis on mitigating chronic non-cancer pain found that participants who used marijuana reported greater overall pain and lower self-efficacy^{xi} in their ability to manage their pain.¹⁰⁸ There was no evidence that marijuana use reduced pain or exhibited an opioid-sparing effect, which is commonly touted by “medical” and “recreational” marijuana enthusiasts. The RAND Corporation released a study in 2018 stating that the relationship between “medical” marijuana and lower levels of opioid overdose deaths is complex and appears to be changing as marijuana laws and the opioid crisis evolve.¹⁰⁹ The researchers also found that even if “medical” marijuana patients replaced opioids for “medical” marijuana, the patients did not embody a measurable part of the prescribed opioid market.¹¹⁰

The Centers for Disease Control and Prevention (CDC), along with the FDA, publicly state that researchers do not have enough evidence to condone marijuana use as a substitute for opioids.¹¹¹ A body of evidence has not been established to demonstrate the safety and effectiveness of the entire marijuana plant. The majority of research concerning the efficacy of marijuana as medicine involves either THC or CBD, not the marijuana plant as a whole.

^{xi} Self-efficacy: an individual’s belief or confidence in their ability to complete a task.

Chapter 6: The Inadequacies of Marijuana Reporting Systems

Chapter Summary

Many marijuana businesses are now legally required to monitor their supply chains, similar to pharmaceutical companies. Inventory management is critical in preventing the theft and diversion of products, especially in the drug industry. Seed-to-sale tracking—a common term in the marijuana industry—is a generic phrase suggesting that dispensaries are capable of total accountability. This is inaccurate and misleading as this process has limitations that can be easily exploited. This system may benefit marijuana businesses through enhanced inventory management, but it does little to prevent diversion to illicit markets.^{xii}

Midwestern Requirements

Iowa's mCBD program states that manufacturers must establish an IDPH-approved real-time sales and inventory tracking system that tracks mCBD production from seed through distribution of mCBD to a dispensary.¹¹² This system is also referred to as a seed-to-sale tracking system by the IDPH.¹¹³ The manufacturer must also maintain a constant record of the quantity and form of the mCBD, the number of plants being grown at the facility, and the names of the employees maintaining the inventory.¹¹⁴

Missouri requires that a seed-to-sale tracking system be implemented to track marijuana from either the seed or immature plant state until the marijuana or marijuana-infused product is sold to a qualifying patient or caregiver.

North Dakota stipulates that its registered dispensaries must keep detailed financial reports of proceeds and expenses and that they must maintain all inventory, financial, and sales records in accordance with generally accepted accounting principles. North Dakota dispensaries must also establish an inventory tracking system that utilizes bar codes to track batch numbers, strains, and the amounts of marijuana stored in dispensary inventories, as well as the amounts sold to qualifying patients.¹¹⁵ In the event that another “recreational” marijuana measure is on North Dakota's 2020 ballot, it will

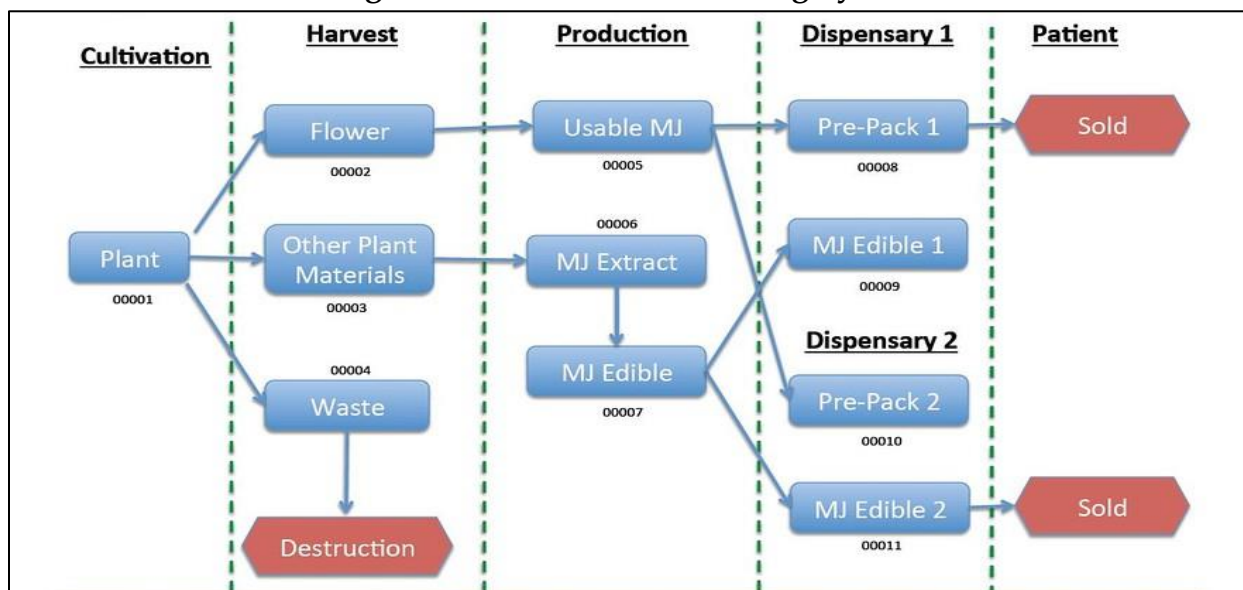
^{xii} The MW HIDTA asserts this as 75 percent of MW HIDTA DHE traffic stops involving marijuana originated from “medical” or “recreational” marijuana states, as did 92 percent of seized parcels containing marijuana that were seized en route to Iowa, Missouri, and North Dakota FY 2018 Q3 and Q4.

likely adopt reporting framework similar to that of the state’s “medical” marijuana program.

Seed-to-sale

This system is intended to ensure that no marijuana or marijuana-infused products are diverted to illicit markets from the cultivation or retail facilities. The examination of this system in other states that permit “medical” or “recreational” marijuana demonstrates that the phrase “seed-to-sale” is actually a misnomer. The term implies that every portion of a marijuana plant, from the initial seed to the end product, can be accurately tracked until the final point of sale. While this is possible, problems in other states with medical or recreation marijuana prove it unlikely.

Figure 19: Seed-to-Sale Tracking System



An illustration of a seed-to-sale tracking system from software manufacturer BioTrackTHC.

RFID

Radio Frequency Identification (RFID) tags and barcodes are the most common tools used in the seed-to-sale process.¹¹⁶ Just as in other industries, RFID devices provide increased visibility of inventory and are typically attached near the base of the stem. This technology allows marijuana cultivators to accurately monitor the number of plants in their facility. Bar codes serve a similar function, although they are more commonly used in the retail sale to consumers. The process of a seed-to-sale tracking begins with the assignment of an RFID and barcode to a seedling that serves as a tracking number. The number is recorded throughout each state of the plant's development process and the associated information is stored for historical records. The development process also records post-harvest information, including changes in weight due to waste products, trimming, drying, and laboratory testing.



Cloning

The diversion of marijuana from licensed marijuana cultivation and dispensary facilities is a driving factor for the necessity of tracking systems in the marijuana industry. Unfortunately, the diversion of marijuana plants and plant products can occur in several stages of the cultivation process. Cloning is a popular method in which marijuana cultivators can make exact copies of a specific cannabis plant by cutting away small sections of the branching stems and replanting them. It is possible to make many clones from the same “mother” plant, which, if grown under the same conditions, will likely yield similar potencies and quantities as the mother plant. Cloned marijuana plants often mature at a faster rate than those from a seed. Marijuana clones contribute to the drug's diversion as they can be taken from a RFID-tagged plant and grown unregistered either on or off the licensed cultivation facility's grounds.

Theft

Theft is another major contributor to marijuana diversion and is especially prominent during the harvesting, processing, and drying phases of the cultivation process. In the harvesting and processing phases, the fully matured plant is cut just above the roots and is weighed to establish the initial “wet weight.” Workers then separate the usable portions of the plant from the unusable, which are labeled as waste products and later disposed of, and weigh both. The weight should be close to the original wet weight. Diversion can occur at this point by removing marijuana flowers and reassigning the weight difference to the waste pile. After weighing, the useable marijuana is set out to dry on a rack. The RFID tag that the plant was assigned as a seedling is attached to this rack. Diversion is possible in this process because the flowers dehydrate in varying amounts, providing an opportunity for an employee to remove small quantities of flowers each batch. Small losses from multiple drying trays over an extended period of time would be difficult to detect. After the flowers have dried, their weight is taken once more and recorded. The difference in the wet and dry weights is attributed to dehydration.

Self-reporting Data Quality

In the marijuana industry, a business’s practice of self-reporting wholesale and retail sales of marijuana is controversial. Reporting in this sense includes information from the harvesting, processing, and point of sale phases of marijuana cultivation. Deliberate misrepresentation of data by cultivators, dispensaries, or their employees creates opportunities for diversion.¹¹⁷

Chapter 7: Marijuana Revenue

Chapter Summary

This chapter will provide an overview of the costs and tax revenue associated with marijuana legalization by examining several years' worth of data from the Colorado Department of Revenue, as well as the estimated revenue that Missouri's and North Dakota's "medical" marijuana programs are expected to generate. Increases in state revenue from marijuana taxes are a driving force behind marijuana legislation.

- The estimated revenue from Iowa's mCBD program is unknown at this time, but all registration and licensing fees will remain within the IDPH's mCBD program to maintain operating costs.
- Missouri's "medical" marijuana program is purported to bring approximately \$24 million in taxes and fees to state and local governments, though this number is unsubstantiated.
- North Dakota's "medical" marijuana program does not levy an excise tax on marijuana sales.
- It is possible that the decrease in marijuana prices experienced by Colorado and Oregon post-legalization may occur in Midwest, especially if "recreational" measures are passed in the future.
 - If this occurs, the revenue generated by marijuana tax may not cover state operating costs.
- The long term environmental, economical, mental and physical health, and societal impacts of marijuana cultivation and consumption are not fully understood. Legalized marijuana is likely to have consequences that scientists may not discover for decades.

Estimated Revenue for Midwest

Iowa's mCBD program mandates that all fees collected from the mCBD program shall be retained by the IDPH for operation of the mCBD registration card program and the licensing programs and shall not revert to the state general fund. Each patient mCBD registration card fee will cost \$100 unless the patient qualifies for a reduced fee of \$25. Primary care registration card fees will cost \$25. Each application fee for licensure as a

manufacturer will cost \$7,500. Each application for licensure as a dispensary will cost \$5,000. Sales of mCBD products are subject only to Iowa state sales tax. Manufacturers must reimburse the Iowa Department of Public Safety for costs associated with background investigations.¹¹⁸

Missouri's "medical" marijuana program levies a four percent tax on the retail sale of marijuana and marijuana products. The tax is estimated to generate annual taxes and fees of \$18 million for state operating costs and veteran's programs, and \$6 million for local governments. Annual state operating costs are estimated to be \$7 million.¹¹⁹ Once the operating costs are covered, the remaining funds will go towards health and care services for military veterans.

North Dakota's current "medical" marijuana program does not have a specific tax on marijuana, similar to prescription drugs. Retail sales of marijuana will only be subject to standard state and municipal sales taxes, which range from five percent to 8.5 percent, depending on the municipality.¹²⁰

Costs and Benefits of Marijuana in Colorado

Many in favor of marijuana legalization tout the enormous revenue that retail sale of the drug will generate. This appears to be a logical argument at a glance, although Colorado's example is not promising. A recent study suggests that, for every dollar gained in tax revenue from marijuana sales, Coloradans spent over \$4.50 to mitigate the social costs of legalization.¹²¹ The Colorado Department of Revenue reported \$247,368,473 in revenue from marijuana taxes, licenses, and fees for CY 2017.¹²² The economic and social costs are reportedly \$1,130,684,226 for the same time frame.¹²³ "Medical" and "recreational" marijuana in Colorado are taxed at different rates, with their respective revenues allocated to different funds and programs. The state's tax structure distributes the money to affordable housing, education, local governments, healthcare, and operational costs. In return, fiscal damages are noted and measured across criminal, health, housing, productivity, tourism, and traffic sectors, as noted in Figure 20.

Figure 20: Monetary Costs and Benefits of Marijuana in Colorado

Costs			
Amount		Sector	Notes
\$ 381,915,043		Health	Hospitalizations
\$ 31,448,906		Health	Treatment for cannabis use disorder
\$ 593,924		Health	Burn treatments
\$ 697,036		Health	Low weight babies
\$ 54,833,218		Health	Cost of physical inactivity
\$ 3,782,625		Productivity	Cost of businesses for policy development
\$ 3,401,300		Productivity	Cost to employer for rehabilitation
\$ 481,600		Productivity	Employees costs for rehabilitation
\$ 423,362,337		Productivity	K-12 drop-outs
\$ 7,194,600		Crime	Arrests
\$ 18,565,226		Crime	DUI court-costs
\$ 1,170,126		Crime	Juvenile court filings
\$ 3,484,282		Crime	Adult court filings
\$ 3,111,114		Crime	Denver-only marijuana-related crime
\$ 87,014,326		Crime	Probationers going back for THC violation
\$ 5,362,620		Traffic	Fatal car accidents
\$ 18,565,226		Traffic	DUIs
\$ 83,732,717		Traffic	Car accidents from impaired drivers
\$ 1,837,500			Evictions due to cannabis, cost to landlord
\$ 130,500			Arrests crossing the border to Colorado
\$ 1,130,684,226			Total Costs
Benefits			
\$ 247,368,473		Tax Revenue	CY 2017 only
\$ 127,452,000		Housing	Increased value of homes in areas with legalized marijuana
\$ 374,820,473			Total Benefits
Difference			
\$ 1,130,684,226			Total Costs
\$ 374,820,473			Total Benefits
\$ -755,863,753			Resulting Total

Source: Centennial Institute, Colorado Christian University, 2018

Additional Costs

There are additional costs associated with legalized marijuana that cannot be accurately calculated. The cost to the environment, for example, is difficult to measure as the full force of marijuana's impact gradually plays out over a long period of time. The single-use plastics and stickers used in the marijuana industry will contribute to the growing waste in landfills and oceans as they are not biodegradable.

Another concern is marijuana's effect on adolescent brain development. According to a 2012 study published in the *Proceedings of the National Academy of Sciences*, subjects who abused marijuana in their youth and continued into adulthood demonstrated a significant intelligence quotient decline.¹²⁴ Additionally, cessation of marijuana use in adulthood did not entirely restore neuropsychological functioning.¹²⁵ Global intelligence losses, on a large enough scale, can have widespread social and economic impacts.

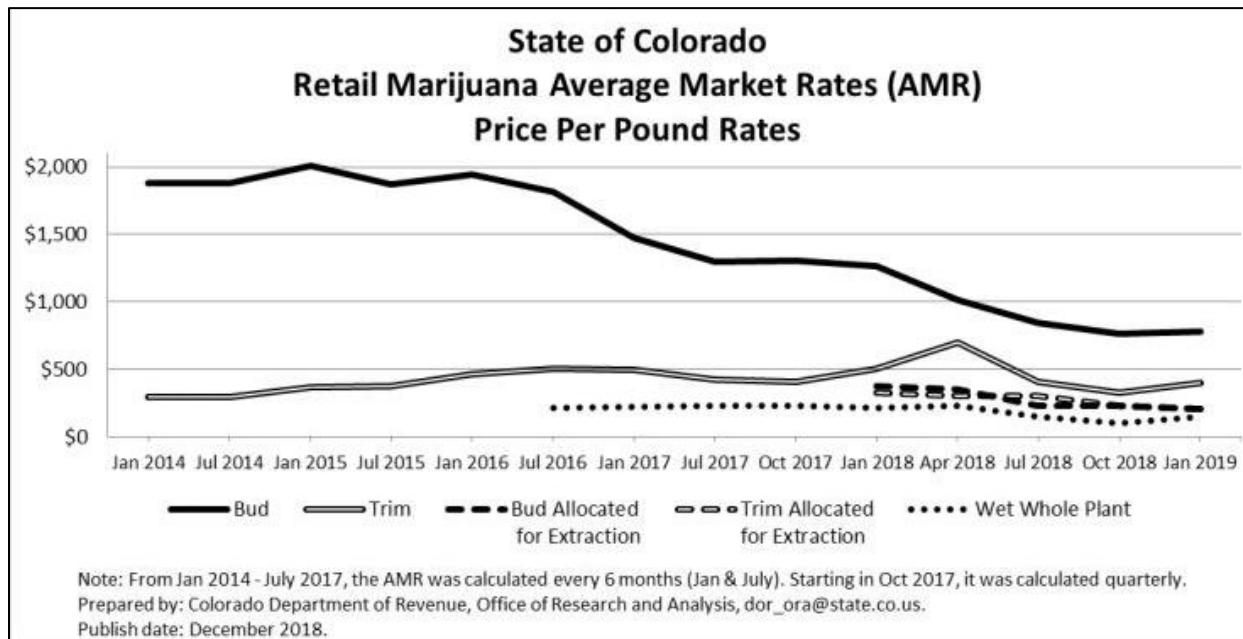
The gateway effect of marijuana is yet another cost that proves difficult to measure. There are strong associations between marijuana use and the initiation of other harmful drugs.^{126 127 128} For example, there is evidence that majority of adolescent and adult cocaine users have previously used marijuana.¹²⁹ Although marijuana consumption and that of other harmful drugs are positively correlated, it does not necessarily represent a causation for more hazardous drug use. Still, with users of marijuana having such a high propensity of using other harmful drugs, the risk for one or more forms of substance use addiction is present. As substance abuse disorders are considered a public health issue, a large portion of drug treatment is funded by Federal, State, and local governments. Substance abuse costs over \$600 billion annual in the United States.¹³⁰

Falling Marijuana Prices

Many states have noticed substantial drops in the price per pound rates of marijuana. Most states with legalized marijuana set their marijuana tax rates as a percentage of the sale price, rather than taxing the drug by weight. If marijuana prices decrease, so will state revenues per marijuana sale. This warrants concern for states that rely upon marijuana taxes as a source of funding as well as a potential increase in consumption as retail prices decline.

In an effort to increase tax revenue per marijuana sale, Colorado increased their marijuana tax rate from ten percent to 15 percent in 2018.¹³¹ The added tax revenue was lost as the state's price per pound rate continued to fall, down significantly since legalization in 2014 (Figure 21).

Figure 21: Retail Marijuana AMR Price Per Pound



Oregon is another state that has experienced dramatic decreases in the price of marijuana. According to the Oregon-Idaho HIDTA, the overproduction of marijuana in the state has caused a 50 percent annual price drop since 2016.¹³² Research states that marijuana consumption in the state is higher among “medical” users, who are exempt from marijuana tax. As of 2018, only 31 percent of available marijuana inventory was distributed, which left 69 percent of the state inventory unconsumed.¹³³ With this unconsumed inventory exists the potential for growers to divert their product to illicit markets in order to turn a profit.

Chapter 8: Regulatory Overview

Chapter Summary

This chapter will provide an overview of the regulations surrounding physician guidelines for marijuana use; personalized dosing; purchase, possession, and cultivation limitations; and the restrictions on the packaging, labeling, and marketing of marijuana and marijuana products.

- The varying levels of cannabinoids across different strains of marijuana and marijuana products make it difficult to practice consistent dosing techniques.
- Iowa's mCBD program limits a patient to a 90-day supply of authorized CBD containing no more than three percent THC.
- Missouri's "medical" marijuana program does not limit the amount of marijuana a patient may possess at one time, although the DHSS may limit it if it chooses.
- North Dakota's "medical" marijuana program limits a patient to three ounces of marijuana every 14 days.
- Unlike other states with legalized marijuana access, neither Missouri nor North Dakota have restrictions on the amount of THC marijuana or marijuana-infused products may contain. Iowa's mCBD program limits THC levels to three percent.

Dosing Concerns and Physician Guidelines

The FDA has yet to approve marijuana as a safe and effective treatment option for any disease or illness. There are, however, THC and CBD FDA-approved drugs that contain formulations of two chemicals found in marijuana. Evidence-based guidelines for effective dosing are available for the cannabinoid drugs that have FDA-approval. This applies only to the limited diseases that the drugs were intended to treat and does not apply to unprocessed marijuana and other marijuana-based products.

The varying amounts of THC and CBD complicate dosing guidelines for individuals using marijuana and marijuana-based products for medicinal purposes. Many scientific reports offering dosage recommendations do so for a very limited range of illnesses and involve only one or two of the active chemicals found in marijuana. These reports do not account for other methods of marijuana consumption, which include

smoking, vaporizing, and ingestion. These reports do not account for the different forms of marijuana or marijuana-based products, which include flowers, oils, waxes, edibles, balms, and transdermal patches. Most patients with qualifying medical conditions use one to three grams of dried herbal marijuana per day and less than five percent use over five grams daily.^{134 135 XIII} Health Canada physicians recommend that their patients consume approximately one to three, but no more than five, grams of marijuana per day.¹³⁶ Although these recommendations come from a reputable health agency, note that they are based on anecdotal evidence and are not supported by scientific research.

Purchase and Possession Limitations

Iowa

Iowa's limited access mCBD program authorizes two licensed manufacturers and five licensed dispensaries to produce and sell authorized products containing no more than three percent THC for non-smoking use by eligible patients with one of nine medical conditions. By rule, the IDPH limits sales of mCBD to patients to a 90-day supply at any given time. Iowa's mCBD program allows patients to possess up to 32 fluid ounces (907.1 grams) of mCBD at any time. Registered caregivers may possess up to this same amount per patient they service.¹³⁷ Personal cultivation of marijuana is prohibited.

Missouri

Missouri's "medical" marijuana program does not place restrictions on the amount of marijuana a patient may purchase or possess at any given time. Instead, the decision to limit marijuana sales is up to the DHSS. If the DHSS decides to enact limitations, a qualifying patient must be able to:

- Purchase no less than four ounces (113.3 grams) of dried marijuana, or its equivalent, within a 30 day period.¹³⁸
- Possess up to eight ounces (226.7 grams), considered a 60 day supply, of dried marijuana.¹³⁹
- Possess up to 12 ounces (340.1 grams) of dried marijuana if that patient cultivates marijuana for medical use.¹⁴⁰
- Cultivate up to six flowering plants for personal use.

^{XIII} This source speaks explicitly in terms of grams of marijuana and does not specify CBD or THC dosages.

Using the aforementioned dosing guidelines provided by Health Canada, an individual using the maximum “recommended” dosage of dried herbal marijuana would align with the Missouri DHSS’ limitations.

North Dakota

North Dakota’s “medical” marijuana program has limited dispensaries from supplying more than three ounces (85 grams) of usable marijuana to a patient within a 14 day period. Patients that live more than 40 miles from a dispensary may cultivate up to eight plants for personal use.

A mature marijuana plant can produce 500 grams or more of marijuana flower in a single harvest, though this is dependent on a variety of factors. Yields may vary depending on the wattage of the light source, total light output, the number of plants per grow space, whether the operation is indoors or outdoors, and other variables. Considering the potential yield of six to eight flowering plants, the total amount harvested each growing cycle may easily exceed the possession limits. The accompanying picture,



A single mature marijuana plant as seen during a Washington State Patrol compliance check.

which illustrates a compliance check on a marijuana farm by Washington State Police, demonstrates just how large one female plant can grow under the right conditions.

Packaging, Labeling, and Marketing

Other states with legalized marijuana access, such as California, Colorado, and Washington, have specific requirements on how marijuana and marijuana-infused products can be packaged, labeled, and marketed. The regulation of packaging used for the retail sale of marijuana and marijuana-infused products is necessary as it can easily be mistaken for non-marijuana containing food, especially by children. These restrictions are among many changes enacted after the rise in marijuana-related hospital admissions and calls to poison control centers (see Chapter 4 Potency).



Several marijuana edibles packaged and labeled to resemble popular brands of candy bars.

Source: <https://tinyurl.com/y9zjn3oy>

California requires that products containing marijuana must be labeled with the cannabis product symbol and must not imitate cartoons, candy, popular characters or phrases, or any other designs that would otherwise be attractive to individuals under the age of 21.¹⁴¹ Colorado requires that all marijuana products must be labeled as containing marijuana and list the strain and batch information. The packaging must be child-resistant and may not imitate any package used for products typically marketed to children.¹⁴² In Missouri, marijuana packaging must be child-resistant and contain instructions for use, as well as an estimated length of effectiveness. The design of the packaging must not cause confusion between a marijuana product and any product not containing marijuana.¹⁴³ In North Dakota, marijuana and marijuana-infused products must be dispensed in sealed, tamperproof containers that clearly identify the compassion center they originated from. The package label must also include the strain name, batch number, product weight, and the level of active ingredients.

In California, Colorado, and Washington State, a single serving size for a marijuana-infused edible product may not exceed ten milligrams of THC.¹⁴⁴ ¹⁴⁵ ¹⁴⁶ The maximum number of servings a marijuana-infused product may contain is ten servings or 100 milligrams of THC.¹⁴⁷ ¹⁴⁸ ¹⁴⁹ At this time, Missouri and North Dakota do not have limitations on the amount of THC that a marijuana-infused edible product can contain nor a limit on the number of servings a product may contain.

Chapter 9: Terminology

Chapter Summary

There are significant differences between “medical” marijuana, “recreational” marijuana, and “medical” cannabidiol. At the time of this report, “recreational” marijuana remains illegal in each state within the Midwest HIDTA.

- “Recreational” marijuana refers to the use of the marijuana plant and its derivatives without medical justification by anyone who meets the minimum age requirements. “Recreational” marijuana typically contains higher levels of THC than “medical” strains.
- “Medical” marijuana refers to the treatment of illnesses and other conditions using the whole, unprocessed marijuana plant or its basic extracts. Only two of the more than 80 active cannabinoid compounds within marijuana have been shown to have medicinal benefits.
- “Medical” cannabidiol means any pharmaceutical grade cannabinoid found in the marijuana plant that has a THC level of no more than three percent and is administered in a form that is recommended by the Iowa medical cannabidiol board.
- Although “marijuana” and “cannabis” are interchangeable, the marijuana industry increasingly uses the latter in an effort to distance the drug from the negative publicity it had received over the twentieth century.

“Recreational” Marijuana

The term *recreational marijuana* refers to the use of the marijuana plant and its derivatives without medical justification. The intent of “recreational” marijuana advocates is to legalize the drug, promote its widespread use, and normalize it culturally. There are various differences between the “medical” and “recreational” marijuana movements and their respective products. “Medical” marijuana usually contains a higher CBD content than its “recreational” counterpart, as the majority of research touting marijuana’s benefits involve CBD’s efficacy in the treatment of certain illnesses. “Recreational” marijuana often contains a higher THC content than “medical” marijuana. The majority of people that partake in “recreational” marijuana use do so to achieve the

“high” effect. In states with legalized “recreational” marijuana programs, individuals are not required to present a physician prescription or recommendation in order to obtain marijuana products. This means that marijuana can be obtained by anyone – so long as they meet the minimum age requirement. “Medical” marijuana must be purchased from regulated dispensaries, which require proof of medical marijuana eligibility. “Recreational” marijuana can be purchased in dispensaries, where allowed, or it can be found alternatively on the street or in public markets as in Washington D.C.

“Medical” Marijuana

It is important to note that the term *medical marijuana* refers to the treatment of illnesses and other conditions using the whole, unprocessed marijuana plant or its basic extracts. In the United States, marijuana is classified as a Schedule I drug under the Controlled Substances Act. Drugs and chemical compounds in this category are defined as having no accepted medical use and a high potential for abuse.

Crude marijuana that is smoked or eaten is a rudimentary delivery system of cannabinoid compounds that, not only is accompanied by approximately 480 other chemical components of unknown effect, has proven to be much less effective than other approved medications in treating specific diseases or symptoms of illness.^{150 151} Prior to modern medical science, some used raw herbs or herbal mixtures in an attempt to treat disease. These maneuvers may have helped at times, but the benefits were weak by today’s standards and were accompanied by unpredictable and dangerous side effects. No other pharmacological medicine has been approved by the FDA for ingestion by smoking in its raw form.

No other pharmacological medicine has been approved by the FDA for ingestion by smoking in its raw form.

The FDA has not recognized the marijuana plant as medicine. Marijuana remains a Schedule I drug while research is conducted on other chemicals in the plant; it is unknown how those chemicals react with each other in varying potencies and it is unknown how they can react with other drugs or chemicals within the human body. With that being said, scientific studies of the chemicals in marijuana, known as *cannabinoids*, resulted in several FDA-approved medications that contain specific isolated cannabinoids in tablet form. The marijuana plant contains more than 80 active chemicals that interact with the human body. Synthetic THC and CBD are the only two chemicals that have been approved by the FDA for specific medical conditions.¹⁵² THC is a psychoactive cannabinoid, while CBD is not.

The FDA “requires carefully conducted studies (clinical trials) in hundreds to thousands of human subjects to determine the benefits and risks of a possible medication. So far, researchers haven't conducted enough large-scale clinical trials that show that the benefits of the marijuana plant (as opposed to its cannabinoid ingredients) outweigh its risks in patients it's meant to treat.”¹⁵³ Each FDA-approved medication undergoes rigorous testing and is designed to treat the specific medical condition(s) for which the tests were performed.

“Medical” Cannabidiol

There are differences between the terms *cannabidiol* and *medical cannabidiol*. In this report, mCBD refers to CBD that is authorized by the IDPH to be dispensed to patients that qualify under the Iowa’s mCBD program. Non-authorized CBD is illegal in Iowa and has not undergone the testing and safety requirements associated with mCBD.

CBD is a specific cannabinoid that many believe may provide therapeutic benefits to those with certain medical conditions. As of 2018, there is preliminary clinical research regarding CBD’s efficacy in treating anxiety, pain, and epileptic disorders.¹⁵⁴ CBD has many other purported benefits, though most of which lack any scientific evidence. This non-intoxicating cannabinoid is not psychoactive and does not produce the “high” that is often associated with marijuana.

The FDA has approved a CBD-formulated prescription drug known as Epidiolex. Epidiolex is a Schedule V controlled substance and is the only FDA-approved CBD product. Epidiolex is a purified form of CBD that is used in the treatment of seizures associated with two specific forms of epilepsy.

Cannabis: A “Rebranding” of Marijuana

Marijuana businesses and advocacy groups have worked tirelessly to change marijuana’s image and acceptability over the last decade. The marijuana industry now uses the term “cannabis” in an effort to rebrand marijuana and distance itself from the stigmatization and negative connotations associated with the term over the past century.¹⁵⁵ The marijuana industry also utilizes the “medical” lexicon, which they exploit in order to market the drug to those who may have otherwise not favored “recreational” marijuana. Although “marijuana” and “cannabis” are interchangeable, the latter is being used more frequently in proposed legislation, research proposals, and marketing.¹⁵⁶ Indeed, cannabis is the scientific name, but it lacks precision as it is used to describe

marijuana strains, the plant as a whole, and its constituent parts. Cannabis is the genus that includes all three of the plant types; Cannabis Indica, Cannabis Ruderalis, and Cannabis Sativa. The word “cannabis” comes from Cannabaceae, which is a family of flowering plants. Whichever term is used, it is important to understand that the marijuana industry has abandoned the paradigm of traditional marijuana; their vision is modeled after the tobacco industry.

In the early 20th century, tobacco companies formulated milder blends and improved curing processes which allowed smokers to inhale more deeply. The increased inhalation facilitated the absorption of tobacco in the lungs and amplified the transfer of nicotine to the brain. In a similar fashion, the marijuana industry has followed suit by increasing THC concentrations and devising new methods to consume marijuana. Vaporizers may reduce the amount of toxins inhaled by the lungs but they also allow users to consume more THC, the ingredient responsible for marijuana’s euphoric, mood-altering, and addictive effects.¹⁵⁷ The focus of “big marijuana” mirrors that of “big tobacco”, which maximizes profits over safety.

Conclusion

Marketed by some as a panacea for economic, social, and medical ills, marijuana legalization is no longer limited to the Western United States. The implementation of “medical” marijuana and other measures in the Midwest must be closely monitored to mitigate the potential negative impacts on public health and safety. The liberal deployment of these programs by policymakers will represent an immense disservice to the region.

Once “medical” marijuana programs are operational in the Midwest, the region may see a decrease in the perception of harm of marijuana among all age groups. Much like the tobacco industry beforehand, marijuana businesses and advocacy groups have continuously worked to transform marijuana’s image over the past two decades.

Based on the experience of others, the Midwest may experience an increase in marijuana use as a result of the increase in both its availability and acceptability. Marijuana abuse among youth and non-qualifying candidates may positively correlate with the increase in access. Ninety-two percent of the top 25 states with the highest marijuana use among those aged 12 to 17 are states with “medical” marijuana, “recreational” marijuana, or both.

The increase in usage may be accompanied by an increase in marijuana-related crime, emergency department visits, hospitalizations, and poison center consultations. The absence of scientific dosage guidelines and increased access among children and young adults will likely add to these hospitalizations, following a similar path as other states with legalized marijuana.

If the strict enforcement and regulation of home cultivation is not employed, illicit local markets may be flooded with potent, high-grade marijuana. The inadequacies of seed-to-sale tracking and self-reporting systems will provide many opportunities for diversion, as demonstrated by the 53,350 pounds of marijuana seized by Midwest HIDTA initiatives in 2018. Seventy-five percent of marijuana seized by the DHE program originated from states with a “medical” and/or “recreational” marijuana program.

Colorado, Oregon, and Washington all experienced increases in violent and property crimes in the years following legalization, according to NIBRS and UCR data. The number of traffic fatalities involving drivers that tested positive for marijuana

increased significantly over the past decade in both California and Colorado. The total number of DRE investigations between 2014 and 2016 that resulted in a marijuana-impaired driving outcome increased by 66 percent in Oregon. With numerous states experiencing similar outcomes, it is reasonable to assume that marijuana-related crime, impaired driving, and the resulting fatalities may increase in the Midwest once the “medical” marijuana programs are implemented in the region.

Many states chose to craft their “medical” and “recreational” marijuana programs using anecdotal evidence rather than empirical data. It is imperative that Midwestern states learn from the sometimes volatile experiences of others in order to safeguard against potential threats to the public health and safety of our cities.

Appendices:

Iowa Code Chapter 124E

Also known as the Medical Cannabidiol Act, Iowa Code Chapter 124E authorizes the use of “medical” cannabidiol (mCBD) to treat a list of qualifying medical conditions.

Administration:

The Iowa Department of Public Health (IDPH) is responsible for the oversight of the mCBD program. The Iowa State Legislature authorized the IDPH to establish requirements for health care practitioner certification, approve applications for patient mCBD registration cards, approve licensure of mCBD manufacturers and dispensaries, inspect manufacturer and dispensary facilities, and collect all application and registration fees.

Qualifying medical conditions:

Physicians may recommend mCBD as a treatment for those diagnosed with one of the following qualifying medical conditions: cancer, severe or chronic pain, nausea or severe vomiting, cachexia, multiple sclerosis, seizures, AIDS or HIV, Crohn’s disease, amyotrophic lateral sclerosis, or any terminal illness with a probable life expectancy of under one year. The IDPH has the authority to add additional medical conditions as the program continues.

Possession/Cultivation:

Iowa mCBD products may contain no more than three percent THC for non-smoking use by eligible patients. By rule, the IDPH limits sales of mCBD to patients to a 90-day supply at any given time. Iowa’s “Medical Cannabidiol Act” allows patients to possess up to 32 fluid ounces (907.1 grams) of mCBD at any time. Registered caregivers may possess up to this same amount per patient they service. Personal cultivation of marijuana is prohibited.

Tracking system:

Iowa’s mCBD program states that manufacturers must establish an IDPH-approved real-time sales and inventory tracking system that tracks mCBD production from seed through distribution of mCBD to a dispensary. This system is also referred to

as a seed-to-sale tracking system by the IDPH. The manufacturer must also maintain a constant record of the quantity and form of the mCBD, the amount of plants being grown at the facility, and the names of the employees maintaining the inventory.

Regulation:

The IDPH must select and license up to two mCBD manufacturers and five dispensaries to cultivate, manufacture, and supply mCBD by December 1, 2017 and shall license new manufacturers or relicense existing manufacturers each year. The IDPH may select additional proposals for up to two out-of-state mCBD dispensaries from a bordering state to sell and dispense mCBD to Iowa-based patients.

Taxation:

Iowa's mCBD program mandates that all fees collected from the mCBD program shall be retained by the IDPH for operation of the mCBD registration card program and the licensing programs and shall not revert to the state general fund. Each patient mCBD registration card fee will cost \$100 unless the patient qualifies for a reduced fee of \$25. Primary care registration card fees will cost \$25. Each application fee for licensure as a manufacturer will cost \$7,500. Each application for licensure as a dispensary will cost \$5,000. Sales of mCBD products are subject only to Iowa state sales tax.

Missouri Amendment 2

Missouri Constitutional Amendment 2 was sponsored by the pro-marijuana advocacy group, “New Approach Missouri,” and passed in 2018. The amendment has been broken down and analyzed in the sections below.

Administration:

The Missouri DHSS is the authority for the “medical” marijuana program and will control state licenses and certifications for marijuana cultivators, dispensaries, patients, and caregivers. It will also allow the department to promulgate rules concerning the state’s marijuana trade, develop identification cards, and issue standards for the secure transportation of marijuana.

Qualifying medical conditions:

Physicians may recommend marijuana and marijuana products as a treatment for those diagnosed with one of the qualifying medical conditions. Some of these conditions give discretion to the physician to decide if marijuana is suitable for an unspecified illness.

Possession/Cultivation:

The DHSS may limit purchases of marijuana to four ounces per patient every 30 days. Patients will also be allowed to cultivate up to six flowering plants on their property for personal use.

Tracking system:

Amendment 2 requires distributors to use a seed-to-sale tracking system. According to the amendment, dispensaries will be required to maintain records of sales which must be made available to state departments and law enforcement agencies. This record must also contain an encrypted patient number that details all amounts and types of marijuana sold to the patient by the seller and must be maintained for five years from the date of sale.

Regulation:

The DHSS is obligated to approve at least one “medical” marijuana cultivation facility license per 100,000 residents and one marijuana-infused product manufacturing facility license per 70,000 residents. The DHSS may not limit the number of marijuana

dispensary licenses to less than 24 licenses for marijuana dispensaries in each congressional district.

Taxation:

This amendment will levy a tax of four percent upon the retail sale of “medical” marijuana at licensed marijuana dispensaries within the state. The tax on retail sales of marijuana will be paid to the Department of Revenue, where the department will keep five percent for collection costs and the remaining funds will be deposited into the Missouri Veteran’s Healthcare Fund.

Support/Opposition:

Amendment 2 was endorsed by the National Organization for the Reform of Marijuana Laws (NORML) and the Marijuana Policy Project. Other notable supporters include former Senator Claire McCaskill, the Epilepsy Foundation of Missouri and Kansas, Our Revolution, and the St. Louis NAACP.

There were ten groups that organized in opposition to Amendment 2. The groups are as follows: Greene County Medical Society, Kansas City Academy of Family Physicians, Kansas City Medical Society, Missouri Association of Osteopathic Physicians and Surgeons, Missouri College of Emergency and Physicians, Missouri Pharmacy Association, Missouri Psychiatric Physicians Associations, Missouri Society of Eye Physicians and Surgeons, Missouri State Medical Association (MSMA), and the St. Louis Metropolitan Medical Society.¹⁵⁸

North Dakota Measure 5

North Dakota Statutory Measure 5 was sponsored by “North Dakotans for Compassionate Care.” The bill passed in 2016 and became law in 2017. The amendment has been broken down and analyzed in the sections below.

Administration:

The North Dakota Department of Health is responsible for the issuance of caregiver registry identification cards, qualifying patient registration, and compassion center regulation.

Qualifying medical conditions:

Physicians may recommend marijuana and marijuana products as a treatment to patients diagnosed with one of many qualifying medical conditions.

Possession/Cultivation:

The North Dakota Department of Health does not allow a compassion center to dispense more than three ounces of usable marijuana to a qualifying patient in a 14 day period. Qualifying patients who live more than 40 miles from the nearest compassionate care center may cultivate up to eight marijuana plants and must notify local law enforcement if they do so.

Tracking system:

Measure 5 requires that compassion centers must keep detailed financial reports of proceeds and expenses and that they must maintain all inventory, sales, and financial records in accordance with generally accepted accounting principles. The compassion centers must employ a bar coding inventory control system to track plant information and quantities sold to qualifying patients.

Regulation:

Compassion centers are subject to random inspection by the Department of Health in order to ensure compliance. A compassion center may not possess more than 1,000 marijuana plants, irrespective of their stages of growth. Compassion centers may not possess more than 3,500 ounces of usable marijuana, regardless of formulation.

Taxation:

The state would not have collected income from marijuana sales as there was no provision for a special tax included in Measure 5. The measure did not establish any specific revenue dedications.

Support/Opposition:

Measure 5 was endorsed by AB Advertizing, Drug Policy Action, and the Marijuana Policy Project. There were no groups that officially registered in opposition, although the North Dakota Medical Association publicly opposed Measure 5.

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